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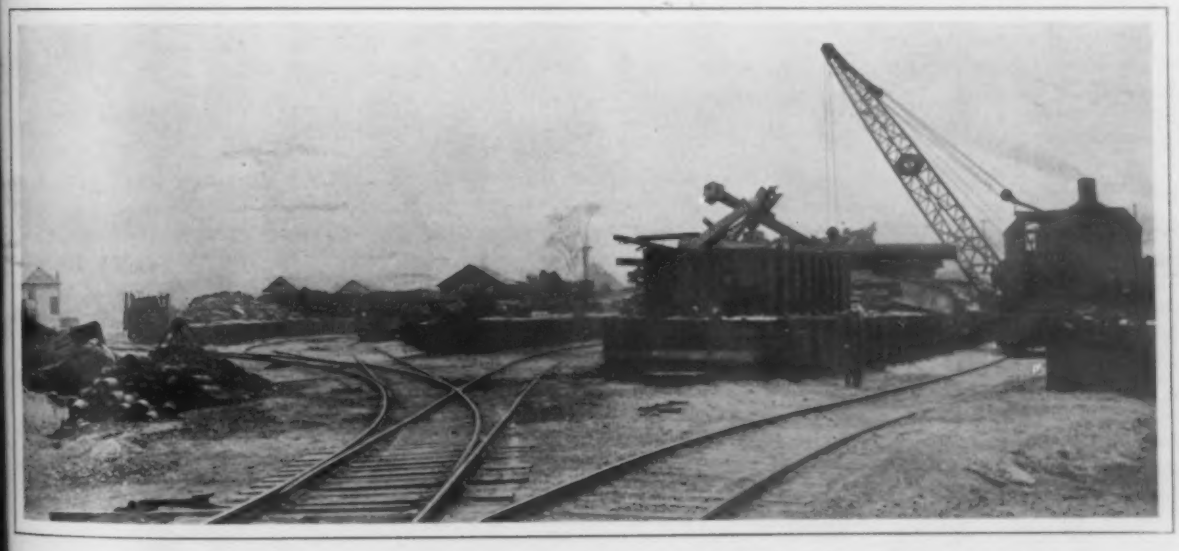
Economy in Scrap Yard Arrangement

Handling Costs Reduced in Youngstown Plant by Having Raised Platforms from Which Material Can Be Shoveled Directly Into Cars

A scrap yard recently established by the Joseph Joseph & Brothers Company, in Youngstown, Ohio, has some interesting features designed for convenience in handling the material and for reducing the handling costs. One of the most distinctive features of the arrangement of the yard is that all scrap iron instead of being discharged from cars on the ground level and being reloaded from the same level is placed on raised platforms, of a height that permits the shoveling of the material directly into gondola cars, doing away with the handling in wheelbarrows. It is stated that this results in a saving of from 10 to 15 cents a ton in labor costs for loading.

The yard occupies a 15-acre site, about 8½ acres of which is now fitted up for use, adjoining the Lake Erie & Eastern Railroad, a part of the New York Central system. As the site is located on low ground a fill was necessary and this fill was made with 4000 car loads of blast-furnace slag. This fill is to a depth of 13 ft. in some parts and its average depth is 9 ft. measured from the top of the platforms. At present 3000 tons of scrap per week is being handled by the yard, but the capacity will be increased to 5000 tons by spring by an enlargement of the yard by filling in the remaining section during the winter and by providing additional railroad trackage.

At present there are four platforms, one 1700 ft. long and 40 ft. wide and the others 500 ft. long and ranging from 70 to 100 ft. across. These platforms are 4 ft. 6 in. high, providing clearance for the rotating part of a locomotive crane. A number of railroad sidings extend through the yard providing at present two miles of trackage. One main siding is built along each side and a number of cross tracks extend through the yard between the platforms so that cars may either be run back on the same track on which they enter or be run to the main yard track on the opposite side.



The Four Platforms As Seen on Approaching the Yard, with Office Building at Extreme Left

The platforms are built of 2-in. oak, boarded on the inner side of posts, the posts being spaced 4 ft. apart, and anchored back with wire. The platforms were then filled in with slag and in the course of a year when the slag is hardened it is the intention to remove the wooden inclosures, leaving the solid slag as platforms. One of the views shows a view of the four platforms and some of the tracks, this view being taken near the entrance to the yard. What appears to be a small extension above the platform at the left of the crane is a coal bin for supplying the crane. The spaces between the first and second and second and fourth platforms are of sufficient width for a single car track with a 4-ft. clearance between the track and the wall. Space is provided between the third and fourth platform

Transfer and Unloading Track at Left and Loading Track at Right. Large size scrap from cars on the left track is piled on the storage platform at the left and small pieces are thrown into the car at the right. After shearing, scrap is shoveled directly into the car adjoining the shearing and loading platform

for two tracks, these being an unloading and transfer track and a loading track. These tracks are close together so that when transfers are made the cars on the tracks are only 1 ft. apart. When unloading cars of scrap in pieces of large and small sizes the small pieces are thrown into the adjoining car and the large pieces are thrown over the other side of the car that is being unloaded, onto the storage platform to be sheared.

For shearing the scrap a No. 3 and a No. 4 Doelger & Kersten Company, Milwaukee, shear, and a No. 6 and a No. 7 shear built by the United Engineering & Foundry Company, are located near the edges of two of the platforms. The larger United shear has a capacity for shearing 10 x 10-in. material. It has an 18-ft. fly wheel and is driven by a 125-hp. motor.

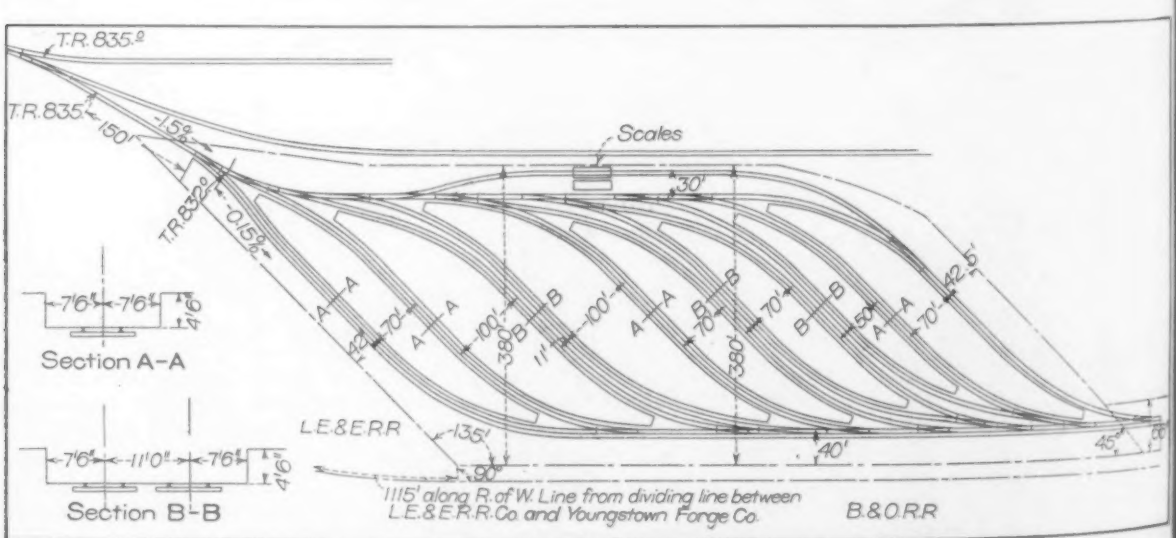
Another view shows a view of the transfer and unloading track, the adjoining loading track and one of the larger shears on the platform at the side of the loading track and the convenient arrangement for handling scrap. Shearing and loading are done by the same workmen, the material being thrown or shoveled directly into the cars after it is cut up to proper size. As the sides of the high gondola cars are but two feet higher than the platform the loading of cars with shovels is made practical as well as economical and the use of wheelbarrows for this purpose is eliminated.

Adjoining the large shear is a derrick built of a box beam girder 18 by 24 in. and 18 ft. high, firmly imbedded in concrete so that the use of guy lines that would interfere with the operation of a locomotive crane is unnecessary. The derrick has a 40-ft. boom and is motor operated. Heavy pieces of scrap are taken from the cars with the derrick, which holds the material while it is being cut-up on the large shear.

For handling material around the yard and for spotting cars a 20-ton McMyler-Interstate locomotive crane is used. This is equipped with a 46-in. Electric Controller & Mfg. Company magnet. At each end of the platform there are water connections for supplying the crane so that it does not have to be moved to replenish the water supply. The steam turbine driven generator on the crane that supplies the magnet also furnishes current for 250-watt lamps in the crane and boom so that the crane can be used at night.

There are no overhead wires in the yard. Cables for supplying electricity for power for the shears and for lighting purposes are carried in fiber conduits, these conduits being placed in concrete. Electricity is supplied at 220 volts. Each shear has an independent power line and switch so that trouble on some of the lines will not necessitate a shutting down of all the shears.

On one side of the yard is a two-story office building and the second floor of this on which the offices are located provides a view of the entire



Layout of Tracks and Platforms, Including Proposed Platforms—the Four Platforms at Left Being Already Erected

yard. This is shown at the extreme left of Fig. 1. The first floor is used as a scale house, storeroom and timekeeper's room. A scale track runs down to the 46-ft. scale platform adjoining the building. The scales are of the Fairbanks self-registering type. All cars both loaded and empty are weighed on entering and leaving the yard.

Battery of 6-In. Cutting-Off Machines

At the Montreal plant of the Dominion Iron & Steel Company, a battery of seven 6-in. cutting-off machines built by the George Gorton Machine Company, Racine, Wis., is producing between 8000 and 9000 shrapnel blanks a day. This installation is a duplicate of the one at the Sidney, Nova Scotia, plant of the Dominion Company and is one of several recently made in Canada.

A Battery of Seven 6-In. Bar Cutting-off Machines Producing Between 8000 and 9000 Shrapnel Billets in 22 Hr.

The machines in general are the same as the one illustrated in THE IRON AGE, Sept. 30, 1909, and use a blade of the internal-tooth type. The bed and the cutter head are of massive construction and the latter is attached to the main driving gear. This arrangement which provides but one joint between the source of power and the cutter teeth and that where the driving pinion meshes with the main gear on the cutter head is claimed to increase the efficiency of the machine. The cutter blade is fastened entirely around its periphery, which is relied upon to prevent deflection and the inserted cutters placed on the internal bore instead of the periphery are keyed in position. It is explained that this arrangement enables the cutters to be fastened securely in place without likelihood of their becoming loose or flying from the pockets. The cutters are both few in number and easily changed.

The machines are operated 22 hr. every day with two shifts of operators. The approximate cost of 100 blanks is between $1.60 and $1.65 for the labor required to handle the bars, place them in the machines, cut them to length, remove the burrs from the ends of the blanks, mark them and load them in the cars.

The Minister of Munitions, David Lloyd George, announces that there are now 2026 government controlled munition establishments in Great Britain.

New Huge Power Plant Near Wheeling

Ralph W. Cooke, Pittsburgh, industrial agent of the Pennsylvania Lines West, states that the American Gas & Electric Company, capitalized at $7,500,000, with general offices at 30 Church Street, New York, and operating plants in a number of cities, has purchased about 600 acres of ground at Windsor, W. Va., between Wellsburg and Wheeling, on the Pittsburgh division of the Panhandle Railroad, on which it will build a large electric power plant. This will supply power for the company's present operations at Wheeling, Canton, Newark and other places in that section and to outside electric companies, street railroads and manufacturers. The original installation will consist of two 30,000 kw. turbines, but the plans contemplate an ultimate capacity of 200,000 kw. The plant is being designed by Sargent & Lundy, Chicago. Contracts have been let to the Foundation Company, New York City, for the installation of intake tunnels and building of turbine foundations, and it will also erect the main building. The General Electric Company will furnish the turbines and the Babcock & Wilcox Company the boilers. A contract has been made with a nearby company to supply coal for the entire plant for the next forty-five years. A double circuit heavy steel line will be constructed to Canton, Ohio, and operated at 140,000 volts. Connection will also be made with the company's present system at Wheeling and Newark. It is expected to have the plant completed and in operation in the latter part of next year.

A 20-In. Heavy-Duty Manufacturing Lathe

The Shook & Fletcher Supply Company, Inc., is building a projectile turning lathe that is being marketed by the Dewstoe Machine Tool Company, Birmingham, Ala. The machine has a nominal swing of 20 in. over the bed, and forgings as large as can be swung over the carriage can be machined. Work 31½ in. long can be handled, and it is pointed out that by reducing the swing greater rigidity and increased convenience of operation have been secured, while at the same time the machine can take care of work usually handled by larger lathes. The single-pulley drive is used in conjunction with a two-speed countershaft to give at least six different spindle speeds. A 1½-in. belt and a four-step cone pulley provide four feed changes ranging from 0.020 to 0.080 in. per revolution of the spindle. An automatic length stop is provided and the equipment includes the customary attachments.

Methods of Controlling Machine Tools

Automatic Mechanical and the Electric Operation Discussed Last Week by the American Society of Mechanical Engineers

One session of the annual meeting of the American Society of Mechanical Engineers was held under the auspices of the sub-committee on machine shop practice. It was given over mainly to a discussion of methods of operating and controlling machine tools and was held on the afternoon of Dec. 8.

Luther D. Burlingame, industrial superintendent Brown & Sharpe Mfg. Company, Providence, R. I., presented the first paper on "Automatic Mechanical Control of Lathes and Screw Machines." He illustrated with specific cases the general principles and organization of devices for automatic mechanical control of lathes and screw machines, which afford the most highly developed examples of such control. The most prominent and essential features in this control were spindle drives, means for inserting and removing the work, feeding and indexing mechanisms and the controlling means for the various mechanisms. The first of these included devices for changing the spindle speed, reversing the spindle and also stopping it. The means for inserting the work comprise bar feeding devices, devices for inserting and removing chucked work and devices for transferring work for secondary operations. The feeding mechanisms were classified as controlled by removable strap cams, permanent cams, adjustable cams and dogs, adjustable dogs on drums, cams which are specially formed for each job and permanently set dogs in combination with adjustable stops. Methods of revolving the turret and locking and clamping it and the means for rectifying the index were included in the discussion of indexing mechanisms. The paper was illustrated by numerous drawings of different machine tools showing the application of the various automatic mechanisms. The accompanying table gives a list of the machines shown and the means employed for controlling the spindle speed changes, the feeding mechanism, the motion of the turret, etc.

E. H. Neff, New York manager, Brown & Sharpe Mfg. Company, said that while he agreed with the statement made by the author that the human factor was less in evidence with automatic machines than with those operated by hand, at the same time it was necessary to have one man of even a higher grade of intelligence than was required for the operation of the hand machines. He also mentioned the use of chute feeding as another method of bringing the work into position for machining. He took issue with the previous speaker on the question of speed and stated that in his opinion the use of automatic machinery, including those employed for cutting gears, would grow.

The second paper of the session was on "Electric Operation and Automatic Electric Control for Machine Tools," by Louis C. Brooks, industrial control department, General Electric Company, Schenectady, N. Y. This paper was in a sense a companion to the previous one, and also to that on automatic machines presented by Ralph E. Flanders before the International Engineering Congress at San Francisco and printed in THE IRON AGE, Nov. 18, 1915. The paper traced the application of electric motors to machine tools from the time when hand starting devices were employed up to the present, when automatic starters with remote control are considered best suited for this class of work, although there are a number of cases for which hand starters are better suited. The advantages of automatic control such as the attaching of the operating switch to the machine and the location of the main panel at some distant point, the regulating of the starting time of machines automatically to suit load conditions of the motor and the attaining of accurate stopping points by dynamic braking were touched upon. All panels should be provided with a fool-proof inclosing case which meets all of the Safety First requirements that were applicable, and automatic starters and control ap-

Automatic Features of Different Lathes and Screw Machines

Machine	Spindle Speed Change	Inserting Work	Feed Mechanism	Turret Motion	Turret Locking
Gisholt Lathe	Dogs on drums actuating gears	.....	Adjustable dogs on drums	Geneva stop	Wedging action shoes
Potter & Johnston Screw Machine	Dogs on disk actuating gears	.....	Permanent cams and dogs	.....	Central stud operated by cam action of projecting lug
Gridley Automatic	Cams on drum operating controller	.....	Permanent cams and dogs	.....	.....
Brown & Sharpe Screw Machine	.....	Adjustable cam	Specially formed cams	Geneva stop	Pin engaging turret
Jones & Lamson Screw Machine	.....	Gears and worm and worm wheel	.....	.....	.....
New Britain Screw Machine	.....	.....	Removable strap cams on drums	Geneva stop	Pin engaging turret also notches in d
Cleveland Automatic Machine Company	.....	.....	Permanent cams and adjustable cams and dogs	.....	.....
Warner & Swasey Company	.....	.....	Adjustable dogs on drums	.....	.....
Bullard Vertical Lathe	.....	.....	Permanent dogs and adjustable stops	.....	.....
Davenport Machine Company	.....	.....	.....	Crank operating curved sliding block	.....

The discussion on this paper was opened by Ralph E. Flanders, Jones & Lamson Machine Company, Springfield, Vt., who commended the paper and pointed out that higher speeds and feeds were possible with hand-operated machines for certain classes of work, as the operator was present all the time and could see what was going on, which was not true in the case of the automatic machines where one operator handled several. On the other hand he pointed out that the time lost by the slower feeds of the automatic machine was more than made up by the increased production possible from a group of automatic machines.

paratus should have protection from low voltage and also from excessive overloads.

The three general types of automatic starters, which depend on the time element, counter emf. and current limit, were discussed. In general the starters for small motors consisted of line contactor, overload relay, field rheostat and connecting board, while for larger sizes where resistance must be inserted in the circuit, a line switch and fuses, line contactor, counter emf. accelerating contactor and connection board were included, the last being modified in still larger motors to accommodate additional accelerating contactors. The applica-

tion of this control to machine tools, such as lathes, boring mills and planing and slotting machines, was touched upon, it being pointed out that at the present time the problem of purely automatic control for general lathes has not been entirely solved, although special purpose lathes have been controlled with safety and efficiency. The question of the type of motor to be used was discussed. The shunt motor was applicable to small printing presses, ventilating fans, small machine tools, woodworking machines, etc., and can be used with heavy lathes, planing machines and boring mills where the speed is to be varied. The series motor, because of the desirability of having a certain friction load, should be employed for centrifugal pumps, cranes and hoists.

The discussion was opened by Harry F. Stratton, general manager and chief engineer, Electric Controller & Mfg. Company, Cleveland, Ohio, who spoke of the development of the motor starter of his company and further of the advantages of adjustable-speed direct-current motor for driving machine tools. The main factor leading to the decision as to the particular type of control to be used on any machine was the increased capacity.

H. P. James, Westinghouse Electric & Mfg. Company, East Pittsburgh, exhibited a number of lantern slides showing the diversity of machines to which motor drives had been applied.

Charles D. Knight, industrial control department, General Electric Company, Schenectady, N. Y., pointed out that with the automatic control it was possible to have the speed constant at any time, and that the use of the automatic control system also tended to increase the safety of the operator.

H. K. Hathaway, consulting engineer, Philadelphia, deplored the lack of automatic means for stopping the motor in case of accident to the machine tool and pointed out that the application of motors to tools, such as milling and drilling machines, that were not strictly automatic machines, afforded a fertile field for investigation.

Frederick L. Eberhardt, Gould & Eberhardt, Newark, N. J., mentioned the necessity for co-operation between the electrical engineer and the machine tool designer in order that the apparatus might be properly mounted.

Ralph E. Flanders, Jones & Lamson Machine Company, Springfield, Vt., spoke of the use of belts on motor-driven tools, and Charles Fair, power and mining engineering department, General Electric Company, Schenectady, N. Y., said the type of control must be determined entirely by the needs of particular cases, and it was therefore not possible to lay down any hard and fast rule.

E. H. Neff said that in his opinion constant-speed motors were best suited for driving screw, gear-cutting and grinding machines and that the proportion of machines sold with the motor attached was small. He favored the use of gears mounted on the machine itself to secure the necessary changes in speeds and feeds.

To Promote Baltimore's Manufactures

An organization has been formed in Baltimore, Md., to promote the development of manufacturing interests in that city by helping to finance established industries and securing new ones. The organization is known as the Industrial Corporation of Baltimore City. It will make thorough examinations into the financial standing and possibilities of profit to industries needing financial aid for the purpose of helping them to secure additional capital or banking accommodations and to investigate manufacturing enterprises seeking a location. It will not offer a bonus to new enterprises. The president of the organization is John P. Bland, president United States Fidelity & Guaranty Company. The treasurer is Eugene Levering, president National Bank of Commerce. The secretary, to whom communications should be addressed, is C. C. Pusey, 200 United States Fidelity & Guaranty Company Building, who was formerly assistant treasurer of the United States. The directors represent a large number of the most prominent manufacturing companies and financial interests of the city.

World's Ample Iron-Ore Supplies

G. D. Chamberlain of the open-hearth department of the Carnegie Steel Company's Edgar Thomson works addressed the students of the University of Pittsburgh last week on some phases of iron and steel manufacture. The world's principal iron-ore deposits were referred to at some length, and the speaker used numerous lantern slides. What was said as to the world's iron-ore supplies and as to the importance of the Brazilian deposits is given in the following extracts:

"A few years since not a little anxiety was felt as to the possible exhaustion of the world's supplies, by economists in many lines, some going so far as to say that within fifty years the world would be in a bad way for iron ore. Fortunately, nature has been ever bountiful in providing for man's wants and her prodigality has not been lacking in this. In the last ten years additions to the world's ore reserves have been enormous, so that the possible exhaustion of known deposits has been pushed so far forward that the least confident do not worry as to the near future—at least measured by several generations and possibly several centuries. Geochemists tell us that about 4½ per cent of the lithosphere, or crust of the earth, is iron and that this holds approximately throughout the entire surface. Now, as essentially the same geologic forces have been at work throughout the world to produce ore deposits, it is only reasonable to expect the same results, and therefore in partly known and in unknown sections to anticipate accumulations of ore approximating those in thoroughly prospected sections of the globe. Looked at in this way, and it seems a rational view, there would seem to be no occasion to worry over a future ore supply. . . . . .

"The fourth great deposit on the Western Hemisphere [Lake Superior, southern Appalachian and Cuban mines being previously mentioned] is that of Brazil, located in the State of Minas Geraes, some 300 to 400 miles north of Rio and about the same distance from the coast. By every mining geologist and engineer who has visited the region, it has been pronounced the greatest known deposit in the world. While extended developments may modify present knowledge, enough is definitely known to place it among the largest, and there is enough reason to believe it may exceed the present conservative estimates. By way of comparison, the estimates of some half dozen eminent geologists essentially agree in stating the deposit contains approximately double the tonnage of our Lake Superior region.

"It is interesting to note these four deposits lie in a straight line, extending from northwest to southeast at an angle of about 45 deg. I do not know that there is any significance, geologic or otherwise, connected with this; possibly only a coincidence."

New Electric Steel Casting Plant at Milwaukee

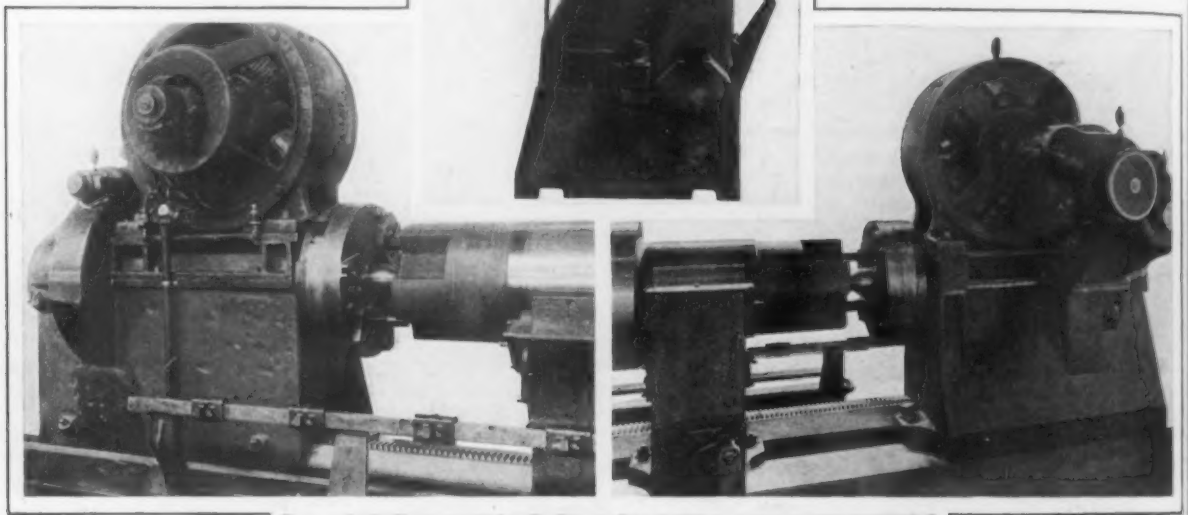
The Electric Steel Casting Company is the name selected for the new corporation which has been in process of organization by Leo G. Smith, former manager of the Prime Steel Company, Milwaukee, Wis. Articles of incorporation were filed Dec. 9. The capital stock is $300,000. Officers have been elected as follows: President and general manager, Leo G. Smith; vice-president and counsel, Chauncey W. Yockey; secretary and purchasing agent, F. G. Wetter, formerly purchasing agent for Prime Steel Company; treasurer, C. F. Taylor. Plans are being prepared by the Raulf Construction Company, Patton Building, Milwaukee for a concrete, brick and steel foundry, 80 x 500 ft. The exact location has not yet been determined. The equipment will include one 3-ton electric furnace, two wall cranes and one 5-ton electric traveling crane.

The Model Foundry & Machine Company, Findlay, Ohio, recently incorporated with a capital stock of $25,000, has elected the following officers: J. J. Zwis, president; Arthur Hosler, vice-president; A. C. Heck, secretary and treasurer. The company will at once begin the operation of a foundry in the plant formerly occupied by the Ohio Well Supply Company. It will engage in general foundry and machine shop work.

HUGE GRINDING MACHINE

Weighing 55 Tons and Taking Rolls 21 Ft. Long and 50 In. in Diameter

A precision grinding machine of the most massive size yet constructed has been delivered to the Carnegie Steel Company by the Norton Grinding Company, Worcester, Mass. This giant machine weighs 110,000 lb. and is designed to grind rolls up to 50 in. in diameter, 21 ft. in length and weighing 64,000 lb. The rolls can be swung on centers or supported on their necks. The machine is capable of removing from 2 to 4½ cu. in. of metal per minute, using wheels 24 in. in diameter with an 8-in. face. It has been computed that with the average wheel used for such work over 3,000,000,000 grains or cutting points are at work each minute.



End, Front and Rear Views of the Headstock of a Roll Grinding Machine Weighing 110,000 Lb. and One of the Pillowblocks in Which the Roll Rests While Being Ground. The Speed Variation Is Obtained by Moving the Handwheel at the Back of the Motor to Permit the Shifting of the Speed Changing Lever at the End. The Pillowblock Shown, Which Is Nearest the Footstock, Has a Micrometer Adjustment to Permit Taper Grinding

The importance of design and construction in a machine for the service it is to perform may be apprehended when it is stated it must produce parallel rolls, free from chatters, wave marks or feed lines, the presence of which is quickly discoverable in the finished sheets.

This machine is built along the general lines of the machine built by the same company for the National Tube Company, Lorain, Ohio, which was described in THE IRON AGE, July 31, 1913, but this second machine has been changed in several features to meet new requirements and to take larger rolls. In this type of machine the wheel is carried on a sliding table and the work does not reciprocate in front of the wheel as is the standard Norton practice. The operator stands on this sliding table where he can see all parts of the machine and work and control the operation of all the units by levers and handwheels. The headstock is rigidly fixed to the base but the wheel table and the footstock can be moved along the ways or the wheel slide moved in or out by both hand and power.

The spindle in the headstock is 12 in. in diameter and 64 in. long, made of cast iron with a bronze bushing for the bearing. This spindle with the bronze worm gear, which is about 24 in. in diameter, weighs exactly 1 ton. The chrome nickel alloy steel centers in the head and footstock are 6 in. in diameter with a 70-deg. taper, and are of the usual lathe type construction. There are a number of different pillow blocks or journal rests for supporting the rolls when grinding, resting them on their own necks or journals and revolving as they do in the sheet mill.

The weight of the grinding wheel, wheel slide, wheel spindle and pulleys, including the wheel guard, is approximately 6000 lb., the solid steel guard covering the wheel alone weighing about 650 lb. All moving and revolving parts of the machine are protected and much care was taken to see that these guards formed adequate protection for the operator. The water pump is capable of delivering 30 gal. of lubricant per minute at the point of contact of wheel and work.

There are four motors on the machine with a rated total of 65 hp. A 20-hp. adjustable-speed motor is mounted on the headstock to drive the work through a set of change gears; a 40-hp. motor on the sliding table makes the table reciprocate and

drives the wheel; a motor on the footstock moves it back and forth on the ways to permit placing the roll in position to be ground and a motor drives the lubricant pump. In operation these motors may be called upon for short periods to deliver up to 100 hp. There are only five leather belts on the machine.

About fifteen months was necessary to produce the 1000 drawings and 5000 patterns required in the making of the 1200 parts in the machine.

Universal Sawing Machine for Shapes

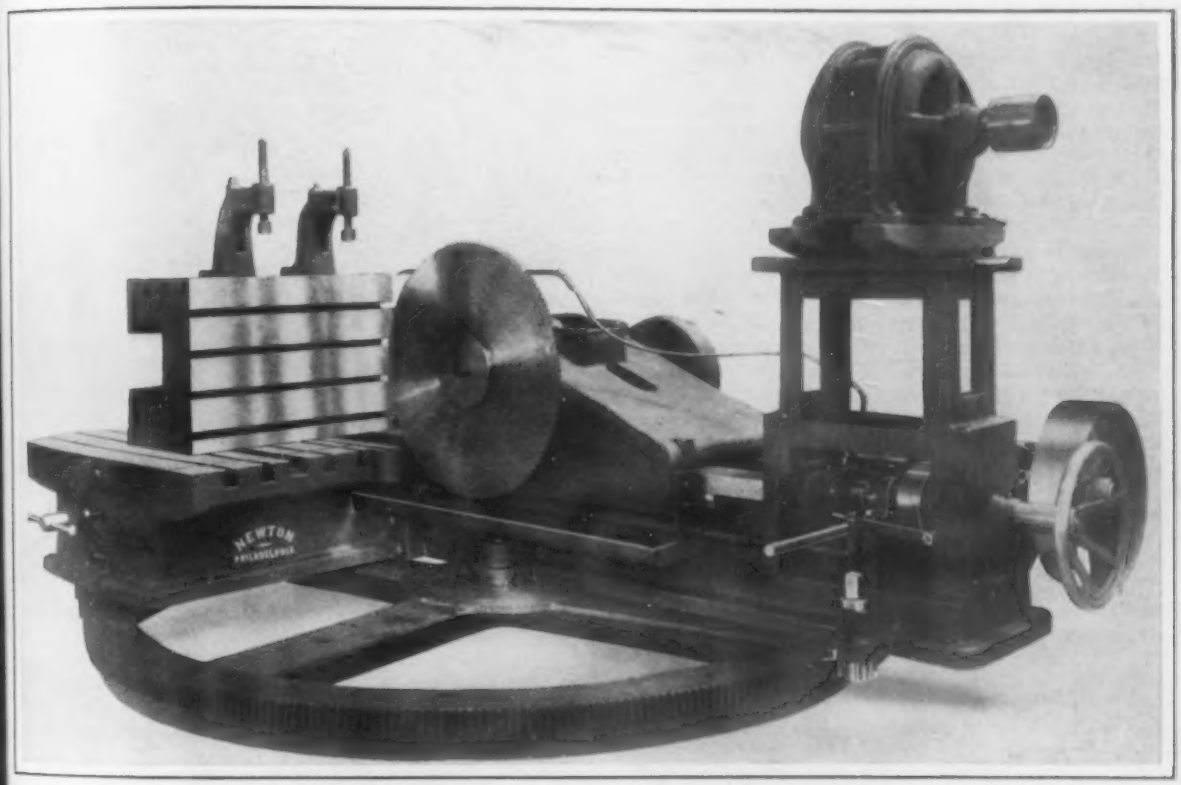
A new design of universal cold saw cutting-off machine intended particularly for use in bridge shops has been placed on the market by the Newton Machine Tool Works, Inc., Philadelphia, Pa. A feature is the table construction which is relied upon to facilitate rapid relocation in connection with the cutting and milling of structural forms and fabricated shapes. With swiveling of the main table is coupled a three-position arrangement for the top table, the combination furnishing a means for holding the various shapes in the different positions required for miter and square cuts and for rotary planing or end milling.

In the position shown the top table furnishes a rigid support for I-beams as it reaches high enough to hold the top flange. In this way it is emphasized that no decrease in the rate of feed is necessary as there is no vibration in the work to be transmitted to the saw blade with a resulting decrease in the amount of work turned out. When the top table is used in the regular way the portion with the opening rests on the main table. In this position it is held in place by a single central clamp which permits the table to swivel without employing a crane for removing the clamps. When cuts at right angles to the axis of the section are to be taken, keys are inserted in the slots to engage with corresponding slots in the bottom table. This arrangement, in addition to controlling the alignment, is relied upon to insure the proper location of the work and take care of the pressure of the cut. To furnish additional clamping convenience in extreme positions a clamping flange surrounds the entire table. Arch clamps arranged with a secondary base which permits the screws to be used in either a horizontal or a vertical position for clamping the work are employed.

The machine illustrated is equipped with motor drive and has hand rotation on the sub-base through an arc of 180 deg. The saw blade ordinarily employed is 36 in. in diameter, which will cut through 24-in. standard beams or rounds 11½ in. in diameter in all locations. By using a suitable cutter head it is possible to face sections measuring 30 in. high and 47 in. long.

The general design of the machine embodies all of the builder's high-production machine features, such as taper shoes for the vertical and horizontal saddle fits, underlocking gibs which are cast integral with the saddles, geared feed changes without removing any of the gears, automatic release and power quick return.

The machine is designed for either standard or Bethlehem sections, and for occasional square cuts on the latter a blade 44 in. in diameter is used.



A Cold-Saw-Cutting-Off Machine for Structural Shapes with Special Table Construction to Facilitate Cutting at Angles and Rotary Planing or End Milling

Record Erection of Giant Hydraulic Press

What is believed to be a record for the fastest time ever made in erecting a large hydraulic press was recently established at the new plant of the Knox Pressed & Welded Steel Company at Wheatland, near Sharon, Pa. This press, which weighs 160,000 lb. and is capable of exerting a pressure of 400 tons, left the plant of Mackintosh, Hemphill & Co., Pittsburgh, on a special train consisting of a locomotive and two cars at 6 o'clock on the evening of Nov. 30. The train reached the Knox plant shortly after midnight and the press was unloaded, set up and grouted in place by the afternoon of Dec. 2, or in less than 48 hr. from the time it left the builder's plant.

Exact Control of Manufacture in Practice*

Applying Scientific Management Discussed in the Light of Four Years' Experience—Strenuous Effort Required for Introducing It Well Repaid

BY GEORGE D. BABCOCK†

Recently the speaker addressed the Manufacturers' Association of Auburn, N. Y., on the subject, "The Executive's Problem."‡ The theme of this address involved different types of executive action as applied to the conduct of a business. Three fundamental types of executive action were presented, the third one of which is commonly known as scientific management. It is a type of management promulgated and practised by our late Dr. Fredreick W. Taylor, in which the executive assumed a more detailed control of work than practised under other forms; in which facts supplant opinion and exact instruction supplants general orders. Tasks are set for each element of the work, and a perpetual check of accomplishment to these tasks is maintained.

I shall go into a somewhat extended discussion of the application of this type of management to a manufacturing business, and from examples gathered over a period of four years of its practice in a most intensive form acquaint you, perhaps better than in any other way, with what repayment may be expected to offset the strenuous effort required for its introduction and continued application.

Preliminary to any active work in the factory the management and more important supervisors must at least agree to be in accord with the new efforts and to give their honest support to such efforts. Those responsible for the work of reorganizing will be reflected by successful or chaotic results. If they fail or go into it with a half-hearted or unscientific approach, conditions will be worse than before the start. If they support and carry it to a successful conclusion, as it will invariably be if carried through, they will marvel at the comfort and lack of discord which permeates the whole works.

The principal elements which enter into a manufacturing effort, arranged in the order in which they will be discussed, are:

(A) Stock on hand available for production.
  1. Productive materials.
  2. Patterns and dies.
  3. Supplies.
(B) Material and work in process of production.
  1. Buildings.
  2. Machines and equipment.
  3. Materials.
  4. Tools.
  5. Men.
(C) Money.
  1. In production.
  2. In supplies and indirect expense.

THE CONTROL OF STOCK MATERIALS

Develop a set of controlling records for the stock which are designed to be absolutely dependable without undue supervision.

Perfect the inspection of incoming materials to the end that inspection precedes receipt into the stock room or stock records and that no rejections shall occur after such record. To secure this, specifications must be exact and the education of the inspectors with respect to the specification complete.

At the end of our year 1911, *the variation in stock room physical inventory with the records was* 2½ *per cent of the value of charges handled during the year. At the end of the year* 1913, *the variation was* 0.03 *per cent. At the end of the year* 1914 *the value was* 0.01 *per cent of all such charges.*

Upon this foundation material schedules, in and out of stock, can be attained with unbelievable exactness.

To insure materials being in stock on required dates, the purchasing agent must provide for the schedules, standard purchasing times for each material class, as forgings; gray, malleable, aluminum or bronze castings; cold rolled bars, nickel steel bars, etc. These standard times are the minimum number of days in which the representative can regularly bargain, buy and deliver to stock each class or special item. From time to time such list will be modified as changes of conditions require.

The standard list now in service contains 72 *classes and items. It is dated May* 11, 1915, *at which time it was last revised To this date, with all the assumed difficulty of obtaining materials, only six changes have been made in time allowances in this list. At this date* 4000 *lots are on order with the purchasing agent. About* 100 *lots are issued to the shop each day. Ninety lots are now waiting to be issued as overdue. This represents about one day's delay.*

The purchasing representative must be specific in requiring that deliveries of materials neither precede the specified date or delay beyond such date. Some variation must of course be provided between the date of delivery to stock and date to send into process. This should be a standard time.

The present standard of stock time is ten days; i.e., if no more stock were received but issues continued per schedule the stock would be entirely depleted in ten days, assuming that receipt and issues occur exactly to schedule. Practically we have attained in late months an actual stock reduction to 11¼ *days' supply without detrimental effect upon productive output or direct productive costs. Previous to new methods and present control plan the stock investment represented a* 50 *days' supply. This automobile stock is admittedly composed of a great variety of classes as well as characteristic parts. Some material is stocked for a complete schedule of six months or more up to three years for lumber. Such material is usually small in bulk, large in numbers and of relatively small value. Other material of appreciable bulk and value may be stocked to the short period of one week.*

From the above we conclude that control of stock has been obtained. Six principal items require control.

1—Requisition of material.
2—Placing of purchase order.
3—Securing of acknowledgments.
4—Receipt of invoice showing shipment of material.
5—Receipt of material into stock.
6—Issue of material to process.

Pattern Control

For castings a pattern must accompany the requisition. This therefore must be control. The principal items entering being:

1—Pattern order placed.
2—Work started.
3-4-5—etc. percentage completed.
6—Delivery to foundry for test casting.
7—Casting received.
8—Issued to shops.
9-10—etc., percentage of casting tested.

*Address given before the University Industrial Society, Bridgeport, Conn., Dec. 3.

†Production manager H. H. Franklin Mfg. Company, Syracuse, N. Y.

‡THE IRON AGE, Aug. 19, 1915.

11—Test completed and if satisfactory release the pattern to purchasing agent to ship to founder for production, or to local founder, from the local pattern control. If not satisfactory recall the pattern and repeat.

The control of dies for forgings is similar to that for patterns. The control items are: 1. Order dies. 2. Secure and inspect lead proofs. 3. Release dies for test forgings. 4. Test out forgings to jigs or for hardness or chemical analysis. Release of dies for production.

Supply Control

Supplies for the shops are controlled under a budget plan. In recent years there has been accumulated a vast amount of information relative to the consumption of perishable supplies at the different classes of machines. This includes grinding wheels, polishing wheels, oils, waste, perishable tools, etc. From this accumulated information budgets are prepared for each department for each month and dates of deliveries of supply materials are controlled to agree with these budgets. While there may be now some variation, the increase of accumulated information will soon make it practically exact.

Supplies are dispatched from the stock rooms sometimes with the tools for the job, and at others to the workmen directly as they come for jobs.

CONTROL OF MATERIAL AND WORK IN PROCESS OF PRODUCTION

This class of factory effort calls for the greatest activity on the part of the organization due to the many complex groups which enter. These principal groups are: 1. Buildings. 2. Machines and equipment. 3. Materials. 4. Tools. 5. Men.

No group or subdivision of a group can remain in partial or without control and the final results be controlled. If the product is complex the least unbalance in the schedules of the groups will cause immediate congestion with a consequent temporary suspension of work in some divisions followed by a corresponding period of excessive activity. There will first be unemployment and later overemployment; idle plant and machines, with a later congested plant and machines. Delayed or limited material may be the cause of a greater congestion than material in advance of schedule. Either condition causes not only extreme dissatisfaction to all persons affected but it means large permanent investments in buildings and other fixed equipment as well as unsalable material and labor.

A uniform burden on the works at the minimum investment is so desirable that all possible effort in this respect will be amply repaid of the classified plan of control is obtained and perpetually applied.

Building Control

The control of buildings for an ascending schedule is not difficult. Plans are laid as for materials and machines. All of the activities which are represented are analyzed and classified. Each class is further divided into its elements, and the date for each element to start, proceed and finish is set. The setting of each date is made with reference to the date for the finish of the completed structure. The time for measurements, i.e., the time required to produce each element is predetermined from exact knowledge and estimates. Promises of architects and contractors are not altogether satisfactory, since rarely do they have the opportunity to plan and supervise as intensely as is customary under the highly developed factory method.

The control of buildings for a descending schedule unless they can be sold for cost less depreciation is never satisfactory. Some relief can be obtained by maintaining peak loads in outside rentals, never carrying a building equipment for probable peaks. The possibility of securing such outside rental is a factor to be considered, for without it, it is either build or pass the business, and the latter is not always the least objectionable.

Storage spaces for materials are constructed identically as for manufacture. As these spaces become occupied with manufacture, materials are crowded out into rentals until the permanency of this rental is evident, then new buildings are provided to house the permanent part of the overflow.

Control of Machines and Equipment

The fundamental of control of machines is the burden. "What machines" and "how many" for a given rate of output of a known product is a perplexing question. Expert mechanics of highly inventive ability in the planning room will specify the first part of this question, i.e., "What Machines." The regulation of the quantity to produce a varying schedule of output can be secured through exact record of the time in which the machine can produce each operation on each piece which is routed over it. If the product is such a one or similar to that now considered, a burden record can be compiled to show each machine by number or symbol with all operation time routed to it for one unit of the finished product. The sum of such times for each machine multiplied by the number of product units to be made each day will give daily task. This daily task divided by the number of machines will give the daily burden. This burden divided by the number of time units in the standard day will show the number of machines required.

Two essentials for the success of this plan are proper time allowance for machine breakdowns or idleness and exact knowledge of unit times for each operation. There is no way of securing their latter except by elemental time study. Since the machine operator's activity is a factor in the time taken by the machine, the operator must also accomplish his effort in the set time. This is prescribed in the instruction card with which the operator is provided. Regardless of the payment of a premium or bonus to the man for special attainments, it is absolutely essential for the welfare of his fellows, as well as the stability of the business, that the machine unit times be obtained and applied. Any delay of a part causes a delay of the assembly into which it goes with a consequent suspension of work of the assemblers. There will also come overdue shipments to the consumers.

The operations on parts which go over each machine having been recorded, from the schedule of the particular operation of that part which must be first worked upon, a date can be obtained for the delivery of the machine to its place on the work floor.

All machines planned for the same kind and quality of work are speeded, powered and made exactly alike in all mechanical respects. They are then classed in groups so that work routed to one can be placed with any of the others with certainty of predetermined standard performance. The group carries the group burden, and in all respects acts as one machine. Each machine in the group is regularly inspected and repaired. Lubrication for cutting edges is controlled by a central equipment circulating to all places of use in the shops.

There are a considerable number of groups with from four to six machines in the group. The most difficult group is that of the turret lathes. Slight variation in the alignment of turret or spindle will eliminate the machine from the group. With a larger productive output the number of machines in each class would grow practically proportional to the output.

Control of Materials

No plans for control of materials over the varied paths in the works can be successful unless controls previously mentioned have been established and are perpetually maintained. Even with this satisfactory maintenance under the usual plans the detail in this effort is enormous. For exact control, and this is so much more satisfactory than that which is approximate, each activity on each part and assembly must be specified. One chief essential, but one seldom practised, is the determination and standardization of lot sizes for each part. These lots will be moved from station to station on the routes as units. Each lot to remain at each station until the work specified to be done at the station is completed on each piece in the lot. Without exceptional orders, once the work at a sta-

tion has been started on a lot of one part until it is finished, no other lot of another part can be started. This precludes the use of stock chasers or other local shop authority since they are not in a position to judge the relative importance of delayed parts as against other work waiting at the machine when the delayed part reaches it.

Under a standard lot size plan, the variations in quantity of output are obtained by corresponding variations in the frequency of dispatching individual lots.

Assume a standard lot of finished product at final assembly to be 50 units, and the schedule to require 10 units per work day. Then lots of parts for final assembly will be dispatched from finished stock each 5 working days. If a product part, 1 of which is used in each unit of the finished product, is moved in lots of 500 pieces, this quantity will satisfy the assembly for 50 work days and will be dispatched from raw materials stock at that frequency. The same frequency obtains at each station on the route. If each lot is 25 days in process from raw stock to finished parts stock, then 2 lots will be in process at all times. If the lot is in process 10 days, then 5 lots will be in process at all times.

Since the same kind of machine work will occur on many different parts, the order of approach of the parts to the machine must be controlled. The parts must be moved to the machines and be recorded at the machine before the work order is given to the operator. If machines are grouped the material must be delivered to the location of the group and this recorded as received. The first free operator in the group must then be given the part next due. This action is readily secured by dating each operation job card at the control board, which insures accurate relative order of work. The jobs for a given group of machines are arranged in a machine job card box in the order of these datings. Dispatch boys local to the shops are held strictly accountable for the giving out of jobs to the operators, in the order of dates.

Any job not issued by a given hour, on the day specified is marked with a "Lot Urgent" card. This card is signed by a superior in the planning department, and upon this signature becomes a standing order to the superintendent and foreman to provide overtime or night work for the job. If any one part becomes overdue with aggravating frequency, or if a machine or group of machines is constantly marked with urgent cards, the routing division is called into consultation to advise a solution.

At the present time there are 12,000 jobs standing in the machine racks. There is an average of 600 jobs started per day. There are 450 urgent tags standing; i.e., one day's extra activity of the working force would bring all work in the shop up to schedule.

The variations in hours work on overtime or night shift is slight. We conclude from this and from the fact that final product follows its schedule exactly, that average errors in operation are constant.

We also conclude that if no urgent tags stood against work, that the investment in work in process account would be excessive, i.e., we would be ahead of schedule on produced parts, which product would remain in an unassembled state, lacking finished purchased parts for its completion.

Scheduling of standard lots, coupled with sure methods of dispatching over well planned routes should obtain most beneficial results from the reduction of investment charge as well as the delivery of salable product.

These are two of the most important accomplishments in factory conduct. Known time elements are fundamental for this conduct. When known they must be obtained regularly in practice.

Previous to the control of our factory work by the above plan, the work in process investment account represented three and one-half cars for each car produced per month. Now it is one and one-tenth cars for each car produced per month; i.e., we turn our money over three times as fast as before.

Control of Tools

Coincident with the routing of operations to machines is the specification of tools. These include jigs, templates, gages. drills, taps, dies, wrenches, and the forms and sizes of all cutting edges. The date of tools due in tool rooms is specified, and the minimum quantity to carry entered on the tool ledgers. The stock is maintained thereafter by the tool ledger requisition.

As each job comes up to a machine the tools are ordered out to agree with the tool list for the operation. These are delivered to the point of use, a signed receipt therefor by the floor executive, delivered to the dispatch clerk releases the job if the receipt for material has been filed.

After tools are used they are returned to the tool stock for inspection, shaping of cutting edges and such repairs as are deemed necessary.

Control of Men

Where large quantities of the same part are made or where the limited performance of a special machine is continuous men are naturally employed steadily on limited work. This limited work is not a function of a particular kind of plan, but rather an economic specialization as is true in all branches of industrial activity from the engineer on a limited train to the farmer at his plow. The miles to go or the acres in the field limit the time of change of application of effort.

A complete knowledge of what is to be done and this taught to the workmen by written instruction allows quite unskilled men to become useful productive units. So many men and their work are misfits and employing men for what they can learn to do and not for what they know makes rather easy the task of the employment agent. Employment centered in a representative of the chief factory executive, and discharge possible only upon the written approval of this executive secures steady permanent workmen. Wages sufficient to interest them in outside investments, work hours which allow them time to supervise and enjoy such investment, permanency of employment assuring the continuity of this enjoyment to all, aid materially to stabilize the force and assure a steady high-grade output with much happiness in the working hours.

Of the force now employed, 20 per cent are over 50 years of age, and 5 per cent over 60. The average age is 37. The average period of last employment for the whole force is four years. For one-half the force, selected, six years. It is evident from this that the labor turnover is very slight.

CONTROL OF MONEY

The index of successful industrial operation which makes comparable various kinds of work and various kinds of control of the same is, "money." I have indicated in this connection the effect of this work on investment charges. I wish to briefly mention the effects upon other prominent factors. The sale price of an improved product has been decreased 30 per cent, caused by corresponding decrease in the costs. The average monthly earning of labor has increased 28 per cent and it still rising. Supervising, or indirect costs, have decreased in the same proportion as direct labor costs.

The control of money spent for indirect purposes is obtained through a supervisor and estimator, who, working from accumulated data, contracts, bids, etc., is able to specify very closely the cost of a given job. After proper approvals and the work is finished, the frequent checks against the work in process and the final result are referred again to the estimate, and the experience so gained is applied to the next work of a similar kind.

CONCLUSION

It has not been the speaker's intent to tell you all

that can be told about the subject of intensive control of manufacturing work, but rather to indicate the elements which enter into such intensive control.

Time, as has been mentioned, is such an essential in the carrying on of a complex business that, regardless of all of the activities of persons hostile to time study, they will never stem the tide of the flood of effort and thought toward a solution of this problem in which fact will supplant opinion and true knowledge will eliminate the fear which now leads to any organized opposition. Premium or bonus methods of payment are not essential in any plan of scientific management if anything can be substituted therefor which will cause a task set by known facts to be carried out regularly.

I feel that the industrial world is greatly in debt to Dr. Taylor and to his associates who have assisted in the promulgation of these principles, and although the way in which they may have been presented may not appeal to some persons, the experiences in industries which have tried conscientiously to carry out the principle without change will sustain the truth of the statements which have been made with respect to it.

Handling Coal and Bulk Materials on a Cleveland Dock

A convenient handling plant designed for handling coal for fueling lake passenger boats and transferring pig iron, steel and various other bulk materials from gondola cars to boats, which is stated to have largely reduced the handling costs, recently has been installed by the Detroit & Cleveland Navigation Company on the new passenger boat docks on the lake front in Cleveland, Ohio. The accompanying illustration gives a good view of a portion of the dock and the handling equipment which is located at the outer or water side of the dock, beyond the freight house in which bigger freight is handled. On the right-hand side of the concrete pier at a lower level than the dock proper are two railroad sidings and between these tracks and the dock there is a spur track, space for which is provided by a curve in the dock. On this spur track is located a locomotive crane.

Coal is taken from the cars by the crane and dumped into a 100-ton bin at the bottom of which are three hand-operated gates 24 x 24 in. in size. The coal is emptied from the bin into 2-ton carts, the larger pieces being broken up as they pass through the gates. Storage battery electric trucks are used as tractors for hauling carts loaded with fuel to the boats and are also used as trucks for hauling other bulk material from the docks and package freight from the freight house. Considerable pig iron shipped from Cleveland to Detroit during the past season was handled on this dock, the iron being unloaded from cars to the dock with the crane and magnet and hand-trucked to the boats. Sheets, bars, pipe and other steel products are also conveniently handled with the equipment provided.

The locomotive crane which was furnished by the Brown Hoisting Machinery Company, Cleveland, Ohio, is of 15-ton capacity and equipped with a 44½-ft. boom and 54-cu. ft. bucket. It is provided with a Kerr turbo-generator and a 43-in. magnet, the latter furnished by the Electric Controller & Mfg. Company, Cleveland, Ohio. The coal bin is 25 ft. high, parabolic in shape and built of concrete reinforced with Ferro-inclave, and was built by the Brown Hoisting Machinery Company. The electric trucks were furnished by Elwell-Parker Company, Cleveland, Ohio. The Automatic Transportation, Buffalo, N. Y., and the Galion Dynamic Truck Company, Galion, Ohio.

Locomotive Crane, Electric Trucks and Other Equipment for Coaling Boats and Transferring Pig Iron and Various Steel and Other Bulk Materials from Cars to Boats on Detroit & Cleveland Navigation Company's Docks in Cleveland

Electric Welding as Developed to Date*

Two of the Three General Processes Which Are Supplementary Rather Than Complementary to One Another—Arc Process Discussed in Last Issue

BY C. B. AUEL

Incandescent Welding

The incandescent or resistance processes of welding differ from the arc processes, not only in the method of obtaining the heating effect of the electric current, but in the further fact that pressure is also an essential factor. It is the introduction of resistance into the circuit such as is caused by a poor contact (Thomson process) or by a poor conductor (La Grange-Hoho process) that produces the necessary heat for welding.

LA GRANGE-HOHO PROCESS

In the La Grange-Hoho process an electrolytic bath is required. The passage of the current through the bath causes decomposition of the electrolyte, bubbles of hydrogen being deposited on the metals to be welded, thus introducing a gaseous resistance in the region of contact between the metals and the electrolyte, with the consequent heating of the metals to incandescence. When the metals reach the proper fusing temperature and while still continuing in the bath, they are forced together under heavy pressure, thus uniting, or they may be withdrawn from the bath after reaching the fusing temperature and welded together under a hammer in the usual manner. As far as it has been possible to ascertain, the process is not used in this country at all.

THOMSON PROCESS

In the Thomson process the welding is effected in the secondary circuit of a single phase (25 to 60 cycle) transformer, which may have a capacity from 1 to 100 kw. or more, the primary being wound for any suitable voltage, the secondary for ½ to 7 volts. The terminals of the secondary circuit generally consist of comparatively large jaws, frequently water-cooled, which clamp the metals to be welded. The power factor of a welding machine of this type will range from 50 to 85 per cent.

In the making of a weld, the ends of the two metals are butted together, first being filed flat if necessary, the lengths of each actually in the circuit being so adjusted as to make them equal in resistance, after which the primary circuit is closed. Current immediately flows through the metals, heating them quickly at their point of contact to the temperature of fusion. They are then forced together by hand or automatically. In certain phases of this process, as the spot welding of sheet metals and the equivalent, the metals to be welded are not clamped in jaws but are squeezed together between the electrodes of the secondary circuit.

Since the operation of welding is at all times under control, the weld may be made quickly or slowly and there is, therefore, no waste of current; furthermore, the heat is self-contained, that is, it is generated within the metals themselves and is, consequently, confined to the small portions between the jaws or electrodes. It is evident that the quality of the welds made by this process should be uniformly higher than those made by any of the arc processes or by the blacksmith, and it is, in fact, only exceeded by the electro-percussive process. The Thomson process is best adapted for repetition work, while the arc processes are rather the reverse. The energy consumption involved in the making of a weld, and omitting all reference to the apparatus itself and the efficiency of operating it, is dependent upon the thermal and the electrical conductivity of the metals, their shapes, lengths, cross-sections, temperatures of fusion and time consumed in welding.

The Thomson process has a wide range as regards the metals as well as the shapes it is possible to weld, and the following covers the metals and alloys which can be welded:

METALS. Wrought iron. Cast iron. Wrought copper. Lead. Tin. Zinc. Antimony. Cobalt. Nickel. Bismuth. Aluminum. Silver. Platinum. Gold (pure). Manganese.

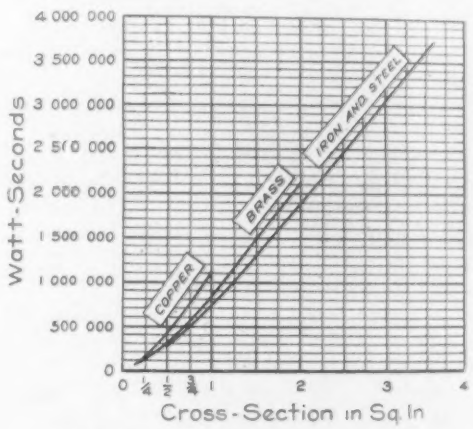


Fig. 6—Energy Curves, Thomson Process

ALLOYS. Various grades of tool steel. Various grades of mild steel. Steel castings. Chrome steel. Mushet steel. Stubs steel. Crescent steel. Bessemer steel. Nickel steel. Wrought brass. Gun metal. Brass Composition. Fuse metal. Type metal. Solder metal. German silver. Aluminum alloyed with iron. Aluminum brass. Aluminum bronze. Phosphor bronze. Silicon bronze. Coin silver. Various grades gold.

COMBINATIONS. Copper to brass. Copper to German silver. Copper to gold. Copper to silver. Brass to wrought iron. Tin to zinc. Tin to brass. Brass to German silver. Brass to platinum. Brass to tin. Brass to mild steel. Wrought iron to cast steel. Wrought iron to mild steel. Steel to platinum. Wrought iron to tool steel. Gold to German silver. Gold to silver. Gold to platinum. Silver to platinum. Wrought iron to mushet steel. Wrought iron to stubs steel. Wrought iron to crescent steel. Wrought iron to cast brass. Wrought iron to German silver. Wrought iron to nickel. Tin to lead. Mild steel to tool steel. Nickel steel to machine steel.

Wires as small as 0.0225 in. diameter can be butt-welded, the strengths of the joints being dependent upon the composition of the materials welded, in general varying from 75 per cent and upwards of the original stock, although certain investigators place the average as low as 63 per cent. Aluminum wires or rods can be successfully welded in the larger sizes; but, in the smaller sizes, the welds will be unreliable, practically disintegrating if any attempt is made to work them.

Aside from the welding of wires, there is a multiplicity of other work, some large, some small, which can be advantageously performed by this process. Among such may be mentioned the welding of rings, buckles, frames for windows and the

*Concluding an abstract of a paper presented at the International Engineering Congress, San Francisco, Sept. 20-25, 1915. In the issue of Dec. 9, the first part was given, devoted to arc welding.

like, bars, rods, pipe, automobile parts, wheels, tires, cylinders, rails, bonds, chains, band-saws, wire fence, handles to blades, drills, high speed to machine steel for cutting tools, crankshafts, etc. One of the most novel applications is the bonding

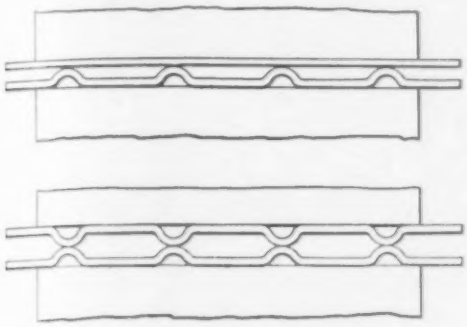


Fig. 7—Methods of Spot Welding

of street car rails. Similar to this application is that of rail welding, but on a much larger scale. In this, about 30,000 amp. at 5 to 7 volts are applied for 2 to 3 min. with a pressure of 4000 lb. per square inch on the weld.

Later developments of the incandescent or resistance process of welding include what are known as spot, point, ridge, projection and button welding, etc., much of it serving as a most desirable substitute for riveting. Briefly, it is the welding of materials in spots or at points and may be accomplished either by simply laying the flat materials together and applying both heat and pressure through the medium of the electrodes, as in the case of thin sheets; or, by first forming points, ridges or projections on the materials when thicker, then applying both heat and pressure; or, by laying the materials together when still thicker and placing between or on either side, a small flat metal button, then applying heat and pressure.

Fig. 7 shows two views of sheets clamped between the electrodes of a spot-welding machine preparatory to being welded. In one of the views, the indentations have been made in one sheet only, in the other they have been made in both.

A still further application of the incandescent process is in the lap welding of thin ribbons, especially those of metals like nickel-chromium on which an oxide forms which is not readily removed. By the use of an embossing tool, such as a pair of pliers with faces like a file and between which the ribbons are squeezed before welding, many exceedingly small points are raised over the surfaces. The scale is thus broken down and good contact secured between the pieces of ribbon when subsequently placed together for welding. The welding may then be readily effected by placing the ribbons between electrodes, also fashioned like pliers, properly insulated and held in the hand during the operation.

ELECTRIC BRAZING

Electric brazing has received comparatively little attention, yet many materials can be effectively joined in this manner. A spot-welding machine can usually be employed with very little alteration, one or both terminals being of carbon or steel, as circumstances require. The "spelter" may for most purposes be either sheet brass or sheet silver from 0.005 in. to 0.015 in. thick, and the flux, when it is found necessary to use any, may be a saturated solution of borax water. The heat, as in welding, is so perfectly controlled that there is no danger of burning the materials. Furthermore, a spot-welding machine, when it reaches its maximum limit in welding, can do still larger work in brazing owing to the lower degree of heat required. When silver "spelter" is used, the joint is more flexible than a welded joint, and there is little danger from brittleness.

The time for brazing a joint will naturally be rather longer than that required for welding, and care must be taken where brazed joints lie extremely close to one another, that the heat from the joint being brazed, does not react on the joint previously brazed and undo it; or does not extend to the next joint to be brazed and heat it sufficiently to cause an oxide to form thus preventing brazing at all. These are, of course, the two extremes and are, ordinarily, not likely to occur; but where there is any possibility of such conditions, dampened asbestos will prevent the former and borax water the latter.

Electric soldering may be done in much the same manner as electric brazing, though it is perhaps more usual to butt together the metals to be soldered and after heating them to apply the solder by means of a soldering stick, rather than to use sheet spelter as in brazing.

Electro-Percussive Welding

As the electro-percussive method of welding is of more recent origin than any of the other methods, less is known of its ultimate possibilities, more especially with reference to its adaptability. It will weld together any two metals, whether alike or unlike as to their composition, melting point, conductance, in fact, quite regardless of their characteristics, though such combinations as silver and tin, or aluminum and tin, iron or lead will of course not be permanent any more than they will be when welded by any other method, since their alloys disintegrate in time. Thus far, this method has been largely confined to the welding of small wires or the equivalent, aluminum to aluminum or copper, platinum to nickel or copper, thermo-couples, spring steel, etc.

The principle involved is that of percussive contact between two metals with a condenser discharge occurring at the instant of such contact. The various items involved include voltage, velocity and force of impact, capacity of condenser, resistance and inductance of circuit, these being, of course, properly proportioned to one another.

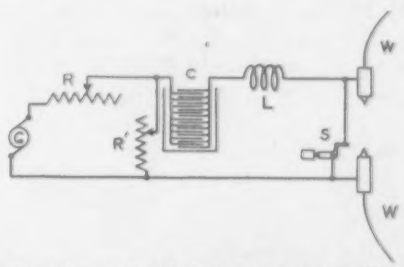


Fig. 8—Diagram of Electro-Percussive Welder

Fig. 8 is a schematic diagram of the method. The welder is much on the order of a miniature pile-driver, two grips for holding the metals to be welded being provided, one of these located at the base and corresponding to the pile, except that it is stationary, the other corresponding to the driver and dropping upon the pile. A small direct current generator, *G*, preferably of 250 volts and about 1 kw. capacity, which is used to charge a condenser *C* of the electrolytic type, through a high resistance *R*. Voltage control is secured through variation

in the field of the generator, as well as by means of resistances, R and R^1. The welding apparatus proper W-W is connected to the condenser through an inductance L, long flexible leads being used to permit ready moving of the welder from place to place without the necessity of disturbing the auxiliaries. The terminals of the welder are bridged by the switch S, except in the actual making of a weld when the switch is opened; thus no potential difference exists between the terminals while inserting or removing wires from the welder.

In making a weld either the metals to be welded, or if wires, their ends, are placed in the grips; the switch S is then opened, charging the condenser. A catch is finally released allowing the driver or hammer to fall, bringing the metals in so doing into percussive contact and making the weld which only requires the removal of the burr to complete it.

In explanation of the theory connected with the operation, it may be said that at the instant of contact, the condenser current is so heavy that the ends of the abutting metals are vaporized by the explosive discharge; and, due to the blow delivered by the falling mass, are forged together. The heat produced, though intense, is developed so quickly that it is confined to the extreme surfaces of the metals and there is, therefore, no opportunity for unequal heating with its possible deleterious effect on the welded materials. This generation of heat is dependent upon there being a certain resistance in circuit at the ends of the metals being welded at the instant of their contact. It is, therefore, necessary to "V" them at right angles to each other with a pair of pliers.

The condenser current vaporizes the extremely small sections of the abutting metals and melts immediately thereafter the approaching surfaces of the two metals. This vaporization must of necessity result in a separation of the metals for an instant, not, however, due to any reversal in the direction of travel of the falling metal but simply because the rate of vaporization is greater than the velocity of the approaching surfaces. Upon the metals coming together again, the arc is extinguished and forging occurs.

The weld takes the form of a sharp dividing line between the two metals, and on each side of it the original materials are found with no change in their physical properties, such as brittleness for example, either at or near the weld, as sometimes occurs in the resistance or incandescent method of welding. Hard drawn materials are not softened, soft materials are not hardened, nor is the temper of springs affected. Several theories have been advanced to account for these apparently irreconcilable statements. The almost instantaneous heating and cooling may not give time for molecular changes; or, if it does, the amount of material affected may be inappreciable. Further, with certain metals like hard steel, the heat generated is so quickly transferred into the shanks of the metals being welded, that the softened material is as quickly re-hardened. In the case of hard copper, silver, etc., it may be that the softened material is again hardened by the cold forge after cooling.

The American Brass Company, Kenosha, Wis., on Dec. 7 distributed $35,000 among its 1800 employees as a Christmas gift, in appreciation of the co-operation given the company in making 1915 the most profitable year it has ever experienced. To every workman a bonus equal to one week's wages was given. Foremen and members of the office force were presented with checks calling for 10 per cent of their salary. Length of service was not a consideration.

Electric Steel Direct from Titaniferous Iron Ores

Steel produced direct from iron ore in an electric smelter at Belleville, Ontario, Canada, by the Tivani Electric Steel Company involves some interesting features. One is a preheater that utilizes the heat from the waste gases produced during the smelting of the ore. This consists of two wrought-iron pipes 8 ft. long, increasing regularly in diameter from 14 to 18 in. to allow the charge to slide easily down the heated portion. These pipes are inclosed in the preheater stack, which has fire-brick linings and baffle plates with openings arranged in such a manner that the heated gases circulate about the preheater pipes.

The furnace is charged from the upper floor into the preheater, the charge consisting of iron ore, limestone and charcoal, crushed to pass through a 1-in. mesh. The furnace is operated on a two-phase current, the transformers being connected by what is known as the Scot connection. The electrodes are 3 in. in diameter, threaded so that they can pass down continuously and are used up entirely with very little loss from short ends.

The ore treated is an exceptional one, practically free from sulphur and phosphorus, the sulphur showing only a trace and the phosphorus 0.004 per cent. The ore contains 7.5 per cent titanium, 0.11 per cent vanadium, 0.34 per cent nickel with some chromium and manganese and 50 per cent iron. It is claimed to be very easy to smelt directly into tool steel by this process. The company states that by its process tungsten, chromium and other alloy steels can be made directly in one operation from the ores by mixing the crude ores.

The tool steel already made at this plant, from titaniferous ore only, is reported to stand up equally well with high speed steel for any purposes. Samples of the steel, tested at the shops of the Canadian Pacific Railroad at North Bay, for turning cast iron and 0.90 per cent carbon steel stood up at the same speed of high speed steel. In turning milder machine steels at a higher speed, the steel did not stand up with the high speed steel. Satisfactory chrome steel is reported to have been made by mixing crude chrome ore from Black Lake, Quebec, with titaniferous ore.

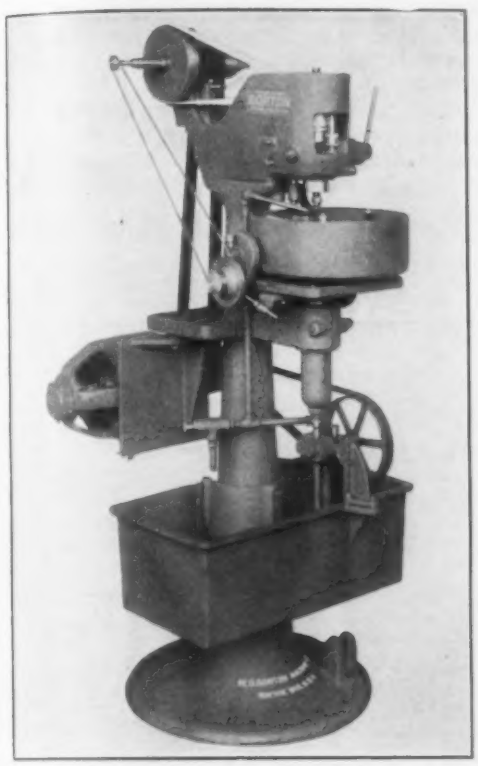
A 1-ton furnace of this design has been operated for two months, demonstrating the practicability of making tool steel from this titanium ore. Owing to the necessity of installing steam hammers and a heat-treating plant as well as the condition of the financial markets, it has been decided to wait until after the war before erecting a 3-ton furnace to make tool steel and steel castings.

The second annual Industrial Safety Exposition of Ohio, under the auspices of the State Industrial Commission, will be held in Central Armory, Cleveland, Ohio, beginning Jan. 22. It is planned to make the exhibit one of the most complete ever held in the United States. In addition to safety and fire prevention devices the exhibit will cover the general field of hygiene, industrial welfare and public health. More than 100 large corporations, including railroads and industrial companies, will make exhibits. The admission will be free and no articles will be sold on the floor. During the exposition a series of round table conferences on accident prevention will be held in the lecture hall on the second floor.

The Maryland State Industrial Accident Commission has handed down an opinion holding that an employee injured while he was disobeying orders and posted rules is not entitled to compensation.

Vertical Milling Machine for Shrapnel

The George Gorton Machine Company, Racine, Wis., has developed a vertical milling machine especially for grooving the timing rings on shrapnel shells. A special work holder and set of automatic stops are employed to insure the rapid production of



Vertical Milling Machine Designed Especially for Grooving the Timing Rings on Shrapnel Shells

duplicate work, and it is possible for one operator to attend to two machines, which further reduces the cost of the work. Micrometer stops are furnished where required to insure accurate work, and all of the adjustments provided in a machine of this type are possible.

The rotary work holder is mounted in the pan, which is secured to the table. The drive for the work holder is first through a round belt from the countershaft and then through a pair of spur gear reductions to a worm shaft meshing with a worm wheel on the work holder. Stops are provided which are relied upon to gage the length of the groove and insure all rings being alike. The fixture shown makes a single revolution per minute, but this speed can be varied by changing the size of the pulleys. The tension of the driving belt can be increased by adjusting the thumb nuts on the threaded rod connected to the swinging bearing on which the lower pulley is mounted. All the parts of the fixture are submerged in oil which tends to increase its life. The swinging pulley runs between friction collars, which are tightened by a knurled hand nut on the outer end of the shaft, an arrangement which permits the pulley to slip when the fixture is stationary.

The spindle is made of hardened tool steel and runs in ball bearings mounted in a sliding sleeve having a vertical hand feed of 2 in. Vertical and radial loads are taken by ball bearings while a nut on the upper end of the spindle takes care of all end play. A micrometer stop graduated to 0.001 in. is provided to insure the depth of cut being the same on all pieces. The cutter gage is adjustable vertically and swings out of the way when not in use to facilitate the replacement of worn cutters without resetting the micrometer stop.

The countershaft, for which a speed of 2000 r.p.m. is recommended, is mounted on the rear end of the cutter head. It runs on ball bearings and has an adjustment to take up any slack in the belt driving the spindle. The speed mentioned is approximate and may vary according to the nature of the work. Tight and loose pulleys are mounted on the countershaft so that the latter may be driven directly from the lineshaft or an electric motor. In the latter case the motor bracket is bolted to the underside of the tool shelf.

The equipment of the machine includes a system for lubricating the cutters comprising a tank, pump, strainer, relief valve, the necessary piping and a flexible tube for delivering the lubricant to the cutter. With motor drive the pump is mounted on the front of the tank and is driven by a belt from the motor pulley. In the case of a belt-driven machine the drive is from the lineshaft and the pump is located on the rear of the tank instead.

The timing rings to be grooved are placed in the work holder and are clamped in place by a half turn of the handle at the right of the work holder. The vertical lever at the right of the cutter head is swung down and feeds the spindle into the work until the flange on the spindle sleeve comes in contact with the micrometer collar. It is explained that on account of the construction of the machine the cutter will remain in this position until the fixture strikes the stop when the lever is swung up, the locking handle is thrown back and the work removed.

Both Case Companies to Use the Name

The Supreme Court of Wisconsin, Dec. 7, handed down its decision in the case of J. I. Case Plow Company versus J. I. Case Threshing Machine Company, involving the right of the defendant to use the names "J. I. Case" or "Case" on products which also are manufactured by the plaintiff. The judgment of the Circuit Court of Milwaukee County is modified in favor of the Threshing Machine Company, which is now permitted to use the names under various restrictions. The ruling of the lower court is that all mail, so addressed as to raise a doubt as to which company shall receive delivery, be delivered to the J. I. Case Threshing Machine Company, to be opened at stated times of the day, at which times the Plow Company may have a representative present. The litigation presented a new situation in trade relations. The lower court ruled, in effect, that a manufacturer could not use his name or any part thereof as a trademark or brand on his products.

Dual System of Lighting

A dual system of lighting for industrial plants, large stores and places where the occupation is dense and panic in times of accidents is possible, was touched on at some length in a meeting on Nov. 8 of the Philadelphia section of the American Institute of Electrical Engineers and Illuminating Engineers' Society at the Engineers' Club, Philadelphia. It appears that in some department stores gas lamps are used in one bay and electric lights in the adjoining bay, so that in the event of an accident, through fire or otherwise, to a part of the lighting plant the chances are that the remainder stays in service. It is stated that the average person would never suspect that different lighting systems are in use.

The Osage Iron Company, Sand Springs, Okla., has decided to build a plant for the manufacture of reinforced steel bars, bar iron and other similar products. The chief person in interest is Barney Smith of the Texas Rolling Mill Company, Fort Worth, Tex.

A Symposium on Industrial Safety

A Session of Last Week's Annual Meeting of the American Society of Mechanical Engineers Discussed Protective Measures for Workmen

The attitude of the employer toward accident prevention and workmen's compensation and the relation between plant management and industrial safety were leading thoughts developed by the industrial safety discussion which the American Society of Mechanical Engineers held at the Friday morning and concluding session of the annual gathering held last week in New York City. Papers were presented by Carl M. Hansen, secretary and chief engineer of the Workmen's Compensation Service Bureau, New York, an organization composed of leading liability insurance companies; by Melville W. Mix, president and general manager of the Dodge Mfg. Company, Mishawaka, Ind.; by W. H. Cameron, secretary of the National Safety Council, and by W. P. Barba, manager of the Midvale Steel Company, Philadelphia, whose paper on "Industrial Safety and Principles of Management" was printed at some length in these columns in the issue of Nov. 25. Leading points of the first three papers are given in the following reviews:

Safeguards and Efficiency

BY CARL M. HANSEN

Where machine tools are to be used only, those should be specified which have all possible safeguards embodied in original design; that is, as an integral part of the machine itself. A safeguard on a machine should not be an extra attachment or an afterthought; it should be as much an original part of that machine as are the gears or the pulleys. A manufacturer of machine tools should consider it an insult to have a purchaser of his product add parts to it after it has been installed.

MACHINE SAFEGUARD NOT AN ATTACHMENT

A guard for a machine should be so constructed as to prevent the removal or misuse of its essential parts. Wherever possible it should be so designed in relation to the machine to which it is applied that the machine cannot be operated unless the safeguard is in position. This may seem to present insuperable difficulties in the design of certain types of machines. It has been the author's experience, however, that where concentrated study has been given to that particular principle in machine design it has been met in every instance.

A further study of the question of safeguarding has brought out the fact that the application of a safety principle often increases the efficiency, as, for instance, in the case of stamping presses equipped with slide and gravity feeds. It is a fact well established in stamping press operations that that method of feed naturally increases the output on the machines where applied and often produces that result. It must be noted, however, that the automatic feed as such does not in itself form a complete guarding of that press. Some further protection must be provided, making it impossible for the attendant to put his or her hands in the actual danger zone during the downward stroke of the ram.

The slipping hazard is one of the most important. A careful study of many accidents as reported has brought out the fact that slippery surfaces constitute one of our largest contributory causes to such accidents. That the slipping hazard is easily and can be practically eliminated by the introduction of anti-slip surfaces on all stairs and on all floor surfaces where employees or other occupants of buildings frequent is an established fact. It is particularly necessary that such anti-slip surfaces be used around machinery.

SAFETY NOT A LEGAL SUBJECT

Safety has been dealt with as a legal subject. We have left it to our courts, to our lawyers, to decide whether or not a building or a machine is safe for its occupants or operators. The author maintains that safety never was and never should have been made a legal question. It is not a question of law; it is in every instance a question of fact, and who is more competent to deal with questions of fact than engineers, especially when these facts pertain to their own business?

From Standpoint of Manufacturer

BY MELVILLE W. MIX*

No manufacturer will make real progress in the safety movement until he takes a personal interest in it and is able to transfer his enthusiasm and earnestness to those directly in charge of work and through them in turn to the workers themselves. The manufacturer will find that the market is full of guards of all kinds for all sorts of protecting purposes and places, and a large supply of propaganda calculated to encourage him to spend money in an endless way on preventive appliances. He will find an army of inspectors ready and active with unlimited recommendations and orders for every machine and for every nook and corner of his factory. He may be persuaded to buy them all and to protect without limit. but if he is not himself converted to their efficiency and need, and if he has not the co-operation in spirit of his employees, foremen and superintendents, his financial investment in them counts for little.

Until we can see the benefits in providing protection to the individual, until we can bring him to see how it affects him physically and financially to "keep right with the guards," we fail to realize the full benefit of the investment of money and time spent in education. As a concrete example of what may be accomplished in this direction, I give here figures (Table 1) showing the experience for the past five years of the company with which I am associated.

Table 1—Cost of Accidents Compared with Payroll, and Time Lost Compared with Time Worked

FIVE YEAR RECORD

Year	1910	1911	1912	1913	1914
Total cost of accidents for each $100 of annual payroll, including first aid, hospital, bills and claims, if any.....	$0.503	$0.228	Score board adopted $0.112	Score board in use. Actual cost $0.079	Score board in use $0.070
Time lost due to accidents beyond the fraction of the first day. Percentage of number of men-days lost to the total number of men-days worked.....	No record kept	No record kept	0.394 per cent	0.1924 per cent	0.1165 per cent

A wage bonus of two days' extra pay for all men in a department having a perfect score for one year was based on the general effect of a cash bonus, but more particularly on the fact that a man will do for the benefit of the gang or department what he would consider beneath his dignity to do to safeguard himself against minor accidents.

Out of 30,000,000 male workers in the United States about 7,250,000 are engaged in the general manufacturing lines. The annual loss due to fatal accident is about 1 to 4000, the lowest of the eighteen principal occupational groups. Yet from the standpoint of public attention, the manufacturer is held up as the cause of nearly all physical suffering and loss due to occupational disaster.

This situation would not exist if the manufacturer were more personally interested and inclined to fight

*President and manager Dodge Mfg. Company, Mishawaka, Ind.

for his rights and a proper recognition of his standing on the score board of national employment. Out of 22,500 fatal accidents in 1913 only 1819 are attributed to the manufacturing occupations, comparatively small, indeed. Yet it can be much smaller if we will only approach the subject from the personal standpoint, evangelize with our employees and arouse in them a spirit of co-operation and thoughtful, prudent regard for themselves and their fellow workers that will be automatic and a habit for protection and carefulness of which they cannot break themselves even if they should wish to. That is the manufacturer's work to-day.

Numerous plans have been devised for arousing and maintaining this personal interest; score boards, bonuses, special favors to winners, lectures, moving pictures and many other plans are being used. To the extent that a management believes in these plans and encourages their uses, just to that extent will it be rewarded with the association of an unimpaired, efficient organization of contented, prosperous workers.

The Attitude of the Employer

BY W. H. CAMERON*

There was a time when workmen were expected to assume the hazards of their work, and employers, through insurance companies, paid as little as possible for accidental injuries or deaths. In one State only seven deaths in the hundred were paid for. Employers were not inhuman—workmen were careless or reckless and simply suffered for their foolishness.

This condition has changed. In thirty States the democracy has said that the financial burden shall be borne by the industry. This meant social and industrial revolution. Many employers predicted that the whole movement was a transient outburst of humanitarianism and that it would die out in the course of time just as fashions in clothes changed. There were others, however, who had an overwhelming sense of the safety movement, who realized that it spelled industrial efficiency and justice and was a symptom of progress in civilization.

BEGINNING OF SAFETY FIRST MOVEMENT

About twelve years ago America began to realize that preventable industrial accidents were a national evil of appalling magnitude. The agitation for workmen's compensation laws brought forth astounding facts and figures. It was shown that both the number of accidents and the economic losses occasioned by them were increasing in ratio more rapidly than the output of our industries, but it was not until the extent of the evil became fully apparent that the safety campaign began.

For many years labor unions had demanded safeguards for machinery, and we had on our statute books various kinds of safety requirements, which, though perfunctorily observed, were not really enforced. As soon, however, as workmen's compensation laws transferred the burden of industrial accidents from the workman to the industry the "Safety First" movement began. Mention should be made, however, of some of the large corporations who had "seen the light" several years previously and had voluntarily taken decisive steps not only to safeguard their employees, but to compensate every injured workman.

Under the stimulation of self-interest national commissions, governmental bureaus, employers' organizations and chambers of commerce began a serious study of the causes of accidents and a possible means of preventing them—the methods of minimizing the losses from accidents. Finally there has resulted a full and free interchange of ideas through various engineering and industrial organizations and through the National Safety Council, which has made the work immensely more effective.

THE FALLACIES EXPLODED

It was commonly assumed that the rapid increase in industrial accidents was inevitably caused by the growing use of power-driven machinery. This view has been shown to be far from the truth, because the majority of industrial accidents are not caused so much by machinery as by carelessness in its use—carelessness proved to be very largely preventable through extensive and thorough educational methods. The employee "took chances" and the employer expressed his attitude on the subject by the slogan, "Get out the work." The man who received his approbation was the man who "did things," and accidents were accepted as part of the price of success. This fallacy had to be very obvious before it was exploded.

This attitude of mind was reflected in the state of the law, which held that while the employer was bound to carry on his work in a reasonably safe manner, in a reasonably safe place, with reasonably safe tools and reasonably safe workmen, reasonable safety did not require him to take undue precautions, the hazard being put on the workmen through the three archaic common law defenses, viz., the fellow servant doctrine, acceptance of risk and contributory negligence. Credit should be given, however, to the concurrent growth of a larger belief in the doctrine of fellowship, and feeling of responsibility for the welfare of their men on the part of a large number of employers has been a powerful adjunct to the force of necessity in bringing activity to a focus.

It was also feared that if machinery could be safeguarded or changed in character or operated at lower speed, economic operation of industry would be interfered with. This, too, has happily been proved untrue, for good safety work has been found the partner and part of efficiency; for, being simply the study of the right and orderly way to do things, it has aided shop methods and economy in a very marked degree. Safety work has therefore evolved as a great constructive economic force in industry, as well as a social and humanitarian one.

ULTRA-CONSERVATIVE EMPLOYER NOT YET AWAKE

The ultra-conservative type of employer is not yet awake to the modern methods of accomplishing results. He is often the man who has come up from the ranks or the one who has inherited the established customs of his forefathers—the employer who feels that he only gets as much work out of a man as he can force out of him—that industry is a struggle between two men as to who will get the "best of the bargain." This type of employer has not taken kindly to the suggestion of his responsibility for safe methods of doing work in his shop. His attitude is that he owns the business; that he has the exclusive privilege of directing it, and the suggestion that his foremen or workmen be asked to tell him where the dangers of the business may lie is obnoxious to him and wrong in principle. He is afraid that if his workmen are organized into accident-prevention committees this will encourage the union idea among his men.

The workmen's compensation law forces this type of employer to study more carefully the causes of accidents suffered by his employees, and because he has to pay the cost of the accidents he may be converted and study the results secured by other employers through more humane measures. He will first have to learn to do business by the co-operative method, and if he wants to eliminate the excessive cost of accidents he must realize that his employees should be recognized as having a part in the organized plan to eliminate accidents. He must be willing to educate his workmen in safe practices—the right way of doing things—to study their operation of the work in his shop from the standpoint of safety and make his workmen understand that safety must be the first consideration.

THE EMPLOYER ON MIDDLE GROUND

A second group of employers may be said to occupy the middle ground. These are the employers owning modernly constructed plants, well ventilated and illuminated and clean and orderly, and who take a modern interest in the safeguarding of machinery if it does not cost too much money, but who do not believe in "new-

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(Continued on page 1427)

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Hobbling Export Steel Trade

The Administration's proposal to tax pig iron 25 cents a ton and finished steel products a like amount may indicate that the steel industry has been judged a fair subject for plucking, and in that capacity is to become the successor of the railroads. Or it may indicate that in looking about for a place to impose a direct tax, iron and steel were selected because many of the producing units are large and can be readily found by the tax collector and thus the bulk of the tax can be got in good-sized sums. The question why this industry has been singled out to bear a heavy burden of direct taxation has had thus far no adequate answer, and the amazement of producers of iron and steel has grown, as they find no program for the assessment of other leading products, as coal, lumber, cotton, wool, copper, not to mention the great cereals, which have been lifted to such profitable levels by the war demand.

Having been stripped by the Underwood-Simmons Act of protection against the dumping of Canadian and European iron and steel, the products of blast furnaces and steel works are now, if Congress agrees, to be handicapped in their competition for foreign markets after the war. Twenty-five cents is no light burden for pig iron to bear. That was the commission paid for selling iron in the old days when $20 was a common price. To-day it represents the selling expense for two to two and a half tons. On Alabama iron, for example, it would mean a 2½ per cent tax when Southern No. 2 iron is selling at $10 at furnace, as it frequently does outside of boom times. Taking the capital outlay required for an average modern blast furnace, a 25-cent tax per ton of output might mean no less than 3 per cent on the investment in the case of a merchant furnace.

Coming to steel works, the pig-iron tax would run up considerably above 25 cents per ton of finished product for a plant combining blast furnaces, melting furnaces and rolling mills. Here, with the added 25 cents for the final product, the latter would really carry a total of 60 to 65 cents in the case of Bessemer steel and somewhat less in the case of open-hearth steel.

When steel manufacturers were interrogated in the last tariff hearings, they were asked to accept a lowering of duties on their products so that a certain percentage of foreign products might come in and thus yield a certain amount of revenue! The same manufacturer is now asked to put a 60 to 65-cent hobble on every ton of his final product, making entry to this market that much easier for his foreign competitor and reducing by that much his power to compete with Germany or any other European producer in neutral markets. Before the war disastrous competition from abroad had already closed the Pacific coast against most Central Western steel makers. After the war the double tonnage tax would operate as a practical subsidy to the foreign steel manufacturer in his campaign for our seaboard and northern border markets.

Trade Balances in a Twelvemonth

From returns covering the major part of the merchandise imports and exports in November it may be estimated roughly that the exports were $325,000,000 and the imports $150,000,000, leaving an apparent favorable balance of $175,000,000. The preliminary statement of the Department of Commerce for October showed a balance of $186,000,000, that apparently being the high monthly record, overtopping the balance of $173,604,366 reported for last February. In November of last year the balance was $79,000,000, and in December $131,000,000, so that last month rounds out a twelve-month period of very high balances. The total for the twelve months, using preliminary official figures for October and the estimate made above for November, is $1,720,000,000. For a number of years the trade balances have averaged about $500,000,000 a year.

These balances, as is well understood, were only apparent. There has always been a large unseen balance. Imports are valued at the foreign port, and therefore the unseen balance includes freights paid to foreign vessel owners on such imports. American tourists usually spend large sums abroad. Workmen with relatives in the old country make considerable remittances to them. Interest and dividends are paid to foreign holders of our securities. There are movements of securities in either direction. After these various factors and a few minor ones have entered, the final net balance in trade is usually settled by gold shipments.

In a general way in recent years the unseen balance has tended to settle the apparent favorable balance, made in merchandise alone, and thus it is that while the apparent merchandise balance is large a small deviation in a year, up or down, is

very important. It would not be fitting, therefore, to observe that while our annual favorable merchandise trade balance averages $500,000,000 a year, and the balance in the past twelve consecutive months, ending November, has been $1,700,000,000, the balance is three and two-fifths times the average. Such a statement would be arithmetically correct, but it would have absolutely no significance. With no change in the unseen balance, it is the excess over the normal that counts. With changes in the unseen balance, they must be included in the reckoning.

Ocean freights are very high, and our imports have been but a trifle below the former average of about $150,000,000 a month in the three fiscal years ended June 30, 1914. More freights, however, are being paid to American vessel owners, so that perhaps there is no unfavorable trend in the unseen balance in this respect. Probably there would be no great change at any rate. Remittances abroad by American workmen are doubtless larger than usual, but the increase would not be of great importance. Interest and dividend payments on securities held abroad have undergone no very great change. Expenditures by American tourists abroad have been almost entirely shut off, involving a large decrease in the unfavorable portion of the unseen balance, variously estimated at $100,000,000 a year and upward. American securities held abroad have been returned to but a limited extent.

On the whole, therefore, there is no reason to conclude that the change in the unseen balance of trade has been unfavorable. As the merchandise balance in the past twelve months has been $1,200,000,000 above the normal it may be concluded that approximately this amount is to be settled. One item in the settlement is the $500,000,000 Anglo-French joint loan. Another item is gold. The excess of gold imports in the first ten months of the present year, no statement for November being available, is no less than $345,000,000, an amount that staggers the experts in exchange matters, as the previous record for the period was $144,000,000, in the first ten months of 1898, when the United States was experiencing the unprecedently large merchandise trade balance that was helping to make the country prosperous again. It should be noted, however, that in the calendar year 1914 there were net exports of gold to the extent of $165,000,000, our merchandise balances being relatively unfavorable.

Our securities did not come back upon us, as was so greatly feared in the early months of the war. If they come back in future we shall be well prepared to pay for them. The ability to pay and the need to sell are both increasing. The United Kingdom's unfavorable trade balance in the ten months ending October is $1,100,000,000 greater than in the first ten months of 1913, the comparable period. England still has great reserves, there being at latest report £51,575,000 gold in the Bank of England, and estimates are made that other banks hold a still larger amount, while the Bank of England holds £28,500,000 against its currency notes. Apparently it is the expectation that if need arises a considerable portion of this gold, the total of which seems to be well over half a billion dollars, can be parted with. Beyond the gold, or the part of it that would be used, lie the English holdings of American securities, which are still estimated in London banking circles at about two billion dollars.

After all, it would be no startling dislocation for a large volume of our securities to be transferred to this side. There would be merely so much less interest and dividends to pay outside in future, payments that are met, in the last analysis, by our keeping up an apparent favorable balance in the merchandise trade. It may be well to think of the United States growing rich, but after all it is a case first of paying our debts and being relieved of the interest charges.

Our Exports of Wire Products

The exports from the United States of wire products, comprising wire rods, plain and barb wire and wire nails, have increased so enormously this year that the statistics of this movement will be of much interest to many of our readers. For the purpose of showing the course of this trade, we have compiled the monthly figures for the first ten months of this year, comparing them with the monthly exports for the whole of 1914, presenting the total of wire rods, plain and barb wire and wire nails, in the following table:

Monthly Exports of Wire Products in 1915 Compared with 1914—Gross Tons

	1915	1914
January	33,104	13,823
February	33,263	16,492
March	43,545	26,211
April	53,714	23,761
May	56,381	21,083
June	79,641	27,848
July	79,082	16,037
August	69,481	9,752
September	81,953	13,236
October	58,594	37,263
November	.....	40,233
December	.....	31,108

The total exports for the ten months of 1915, as shown above, were 588,758 gross tons, against 276,847 tons for the whole of 1914. If the average rate of the six months ended with October be maintained in November and December, the exports of these commodities this year will run up to about 730,000 tons. This is a very large part of the production of our wire industry and accounts for the great activity that has prevailed in the wire trade.

The Increasing Vogue of Duplexing

In these exciting times the importance of the large additions to be made at Gary and South Chicago to the list of duplexing steel works may be overlooked. At many other large open-hearth steel plants the process has already been adopted, and with the additions now in progress it may perhaps be said that the majority of large open-hearth steel works that are distinctly open-hearth works will be using the duplex process for all or part of their product.

The great vogue of the duplex process can be better appreciated if one first counts out the cases in which it is not desirable. In the first place there are the relatively small plants, plants that are not large enough to keep a standard sized Bessemer vessel busy. For such works the blowing department would not be economical as sufficient use could not be had of the investment. Then there are to be counted out the open-hearth departments that are subsidiary to Bessemer departments, for they utilize

very conveniently the scrap produced in rolling the Bessemer steel. Assuming for convenience that the average loss from the ingot to the finished steel as shipped is 20 per cent, a low estimate for most operations, a works containing a Bessemer department of 100,000 tons annual ingot output and an open-hearth department of equal ingot output will produce 40,000 tons of scrap, furnishing 40 per cent of the material to be charged to the open-hearth furnaces. In such a works there is no economy in duplexing. When all such cases are counted out, the remaining works that do not duplex at all will probably be found in the minority.

Duplexing may be referred to as a process intended to enable an open-hearth steel plant to get along without scrap, or with a reduced quantity, or it may be referred to as a process intended to increase the output of a battery of open-hearth furnaces by shortening the time required for a heat, thus conducing to economy of production. The two descriptions really refer to the same thing. In the straight open-hearth process the less the scrap charged the longer the time required to finish a heat, hence the less scrap there is available the more desirable it is to duplex.

In most plants equipped for the use of the duplex process the duplexing equipment appears to be regarded as a means for producing flexibility in output. When demand for steel is relatively light there is a disposition to practise the straight process, the duplex process being brought into requisition when it is necessary to increase the output beyond the capacity of the open-hearth furnaces when employing the straight process. The production statistics confirm this view, for they show that in 1912, a year of fairly heavy production, 7.3 per cent of the basic open-hearth steel was made by duplexing; in 1913, a year also of fairly heavy demand, and probably with somewhat more duplexing equipment available, the proportion rose to 10.7 per cent. In 1914, a year of very light demand, the proportion of duplex steel dropped to 5.1 per cent.

At the present time it is impossible to estimate the scrap supply in proportion to the demand for finished steel, as conditions are altogether abnormal. On the one hand, there is a great deal of steel being produced under specifications requiring liberal cropping of the ingot, and thus tending to produce an abnormal proportion of scrap, while there is also a heavy production of scrap, drillings and turnings, in shops making shells. On the other hand, an unusually small proportion of the total steel produced is passing into permanent construction, such as normally increases the outcome of old material by occasioning the wrecking of old bridges, buildings, etc.

One thing is clear, however, and that is that with a larger and larger proportion of the total steel made coming from the open-hearth furnace and a diminishing proportion from the straight Bessemer converter, the proportion of works scrap available for the open-hearth furnace must diminish. The proportion of material that is not scrap must be pig iron; and as duplexing increases, the proportion of blast furnace capacity to open-hearth steel furnace capacity must increase. When the United States produces basic open-hearth steel ingots in multiples of ten million tons a year it must have a great deal of pig iron. In the past the percentage of basic pig iron produced to basic open-hearth steel ingots produced has ranged from 40 to 60 per cent but in future the percentage must be higher. The increased use at present of duplexing equipment already provided, and the rapid building of additional duplexing departments must increase the pig-iron requirements over the proportions that obtained a few months ago. The pig-iron market, with its rapidly advancing prices in the past few weeks, has already furnished some suggestions of an impending scarcity.

CORRESPONDENCE

Structural Steel Situation in Germany

To the Editor: The question of manufacturing wide-flanged beams has been widely discussed in Germany, and came to such a point that in October, 1915, August Thyssen, the well-known steel manufacturer, and the German-Luxemburg Steel Works, at Differdingen, declared their intention to withdraw from the Steel Works Union (Stahlwerks Verband). The reason for this surprising action can only be found in the fact that a court of arbitration a few weeks ago handed down a decision in favor of the Peine Rolling Mill Company, allowing this company to roll as many Puppe beams as can be done within the limits of its production. This decision has been considered unfavorable to their interests by the two parties named above, who feared for their operations in rolling wide-flanged beams, the German-Luxemburg Steel Works being the owners of the first Grey mill built in Germany, and August Thyssen having recently erected such a mill at his new works in Lorraine. The decision in favor of the Puppe sections means an important step forward in their application. It may be stated in this connection that the above withdrawals cannot stand, according to the by-laws of the "Steel Works Union," and have, therefore, not been accepted by the board of directors.

There has been another interesting development regarding the Puppe beams. A large rolling-mill concern in the Saar district (in western Germany) had, in 1905, erected a mill for the manufacture of Sack beams, i.e. beams with entirely parallel-faced flanges (see report from Prof. Dr. Ing. R. Krohn, Danzig). This mill had been remodeled and improved three times, the last alteration having been completed only a few months ago at a cost of nearly $400,000. Notwithstanding this fact, the company now wants to obtain the permission to roll Puppe sections from the Peine Rolling Mill Company, the latter holding Dr. Puppe's patent rights for Germany.

Since there are some other works interested in the rolling of wide-flanged beams of the Puppe type, there can be no doubt that in the near future in Germany the standard shapes will be replaced by wide-flanged beams, especially by those with parallel-faced flanges, i.e., by the Puppe sections. FR. J. DENK.

Pittsburgh, Pa., Dec. 4, 1915.

Identifying High-Speed Steel Scrap

To the Editor: Owing to the high price of high-speed steel scrap the writer has been frequently asked by shop superintendents for a simple method of identification of high-speed steel.

High-speed steel can be identified quickly in several ways. On account of containing large percentages of tungsten, which is a heavy as gold, it has a specific gravity approximately 11 per cent in excess of carbon steel. High-speed steel could, therefore, be identified by a weight test but, although this method is very simple, it would be inconvenient. The simplest and best method of identifying high-speed steel is to test on an emery wheel. The spark from high-speed steel

is a dark red spark that is inclined to scatter, while the spark from ordinary carbon steel is much whiter and is not inclined to scatter. The spark from high-speed steel is of about the same color as from cast iron; the sparks, however, are much finer.

C. M. BIGGER,
District manager, Vanadium Alloys Steel Company.
Cincinnati, Ohio, Dec. 11, 1915.

The Facts in the Ocean Shipping Problem

The National Foreign Trade Council has published a monograph of 152 pages, 6 x 9 in., entitled "Ocean Shipping." It is intended to be helpful in the development of a sound national shipping policy. The pamphlet presents the basic principles of marine transportation with particular reference to the foreign trade of the United States. It is not argumentative, but brings out fairly and fully the facts about ocean shipping as an industry which the discussions of the past year or more have shown to be little understood in this country. A carefully prepared table shows that there are now building in the United States 86 deep sea steamers, including 26 general cargo steamers, 3 bulk cargo steamers, 9 colliers, 40 oil tank steamers, 4 lumber steamers, 3 molasses tank steamers, and 1 ore steamer. One of these is being built on the Great Lakes.

Out of 44,000,000 tons of shipping owned in the world it is stated that fully two-thirds consist of tramp steamers, of which Great Britain owns 70 per cent. For the most part the chapters deal with normal conditions rather than the special conditions created by the war. It is stated that the war has taken from private commercial employment 20 to 25 per cent of the world's total steam shipping through impressment for government services, destruction of enemy ships and the forcible tying up of vessels at various ports. The ocean freight bill of the United States is discussed. In the year ended June 30, 1914, it was $153,000,000 (though it has been put much higher) of which about 10 per cent is estimated to have been carried under the American flag. The monograph accepts the principle that the consumer pays the freight and that the United States as a whole therefore pays only the freight on imports. Exceptions to this rule are recognized but it is contended that they probably operate more in favor of than against the United States.

Tables are given showing the greater cost of operating vessels under the United States flag. Attention is called to the signs lately appearing that shipbuilding is attracting the attention of persons who intend laying down yards in this country on the theory that as American engineers can underbid the world in erecting structural material used in tall buildings they can do likewise in the building of ships.

American Iron and Steel Institute Reaches the Limit in Active Members

Before the meeting of the directors of the American Iron and Steel Institute Dec. 10, there were only five vacancies in the active list (limited to 1250), and forty-six in the associate list (limited to 250). There were thirty-five nominations for new memberships. Of these about twenty-five were eligible for active membership and the other ten for associate membership. The directors discussed two plans for meeting the situation. One was to increase the active list by 100; the other was to elect temporarily as associate members all but five of those eligible for active membership. In view of the fact that the Institute meetings have grown so large that it is difficult to find hotels outside of New York capable of accommodating them, it was decided not to increase the membership lists. Nor did it seem best to keep the nominees who are eligible for active membership on a waiting list. So it was decided to elect in the order of priority of application five of the nominees as active members and the rest as associate members, the understanding being that those eligible for active membership, who were placed temporarily in the associate list, should be transferred to the active list as vacancies occur therein.

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Steel Corporation's Large Increase in Orders

Next to the largest monthly increase in unfilled orders in the history of the United States Steel Corporation is shown by the statement for Nov. 30—an increase of 1,024,037 tons, or a total of 7,189,489 tons of unfilled orders on the books, as compared with 6,165,452 tons Oct. 31. The record increase was 1,042,874 tons in October, 1912, when the total was 7,594,381 tons. Until the last announcement the second best figure was 942,806 tons in December, 1911. On Nov. 30, 1914, the unfilled orders were only 3,324,592 tons, or less than half this year's record. The greatest recorded unfilled tonnage was 8,489,718 tons on Dec. 31, 1906. The following table shows the unfilled tonnage for each month, beginning Dec. 31, 1912:

Nov. 30, 1915	7,189,489	May 31, 1914	3,998,160
Oct. 31, 1915	6,165,452	Apr. 30, 1914	4,277,068
Sept. 30, 1915	5,317,618	March 31, 1914	4,653,825
Aug. 31, 1915	4,908,455	Feb. 28, 1914	5,026,440
July 31, 1915	4,928,540	Jan. 31, 1914	4,613,680
June 30, 1915	4,678,196	Dec. 31, 1913	4,282,108
May 31, 1915	4,264,598	Nov. 30, 1913	4,396,347
April 30, 1915	4,162,244	Oct. 31, 1913	4,513,767
March 31, 1915	4,255,749	Sept. 30, 1913	5,003,785
Feb. 28, 1915	4,345,374	Aug. 31, 1913	5,223,468
Jan. 31, 1915	4,248,571	July 31, 1913	5,399,356
Dec. 31, 1914	3,836,643	June 30, 1913	5,807,317
Nov. 30, 1914	3,324,592	May 31, 1913	6,324,222
Oct. 31, 1914	3,461,097	April 30, 1913	6,978,762
Sept. 30, 1914	3,787,667	March 31, 1913	7,468,956
Aug. 31, 1914	4,213,331	Feb. 28, 1913	7,656,714
July 31, 1914	4,158,589	Jan. 31, 1913	7,827,368
June 30, 1914	4,032,857	Dec. 31, 1912	7,932,164

OUR OCTOBER FOREIGN TRADE

Tonnage Exports Large, but Not Up to August—Exports of Machinery Make New Record

WASHINGTON, D. C., Dec. 14, 1915.—High figures maintained for exports of tonnage iron and steel and a record for shipments of machinery far in advance of any previous mark are reported for the month of October, 1915, by the Bureau of Foreign and Domestic Commerce. Tonnage exports, while declining slightly compared with August and September of the current year, show a gain of nearly 150 per cent as compared with October, 1914, and of 60 per cent as compared with the high water mark of October, 1913. But for the fact that large quantities of bars heretofore exported as such were converted into shells and shrapnel and transferred in the October returns to classifications not embraced in tonnage commodities, the tonnage totals for the month would have far exceeded all previous figures. All records fell before the huge total of machinery exports in October, which gained nearly 150 per cent over the same month of 1914 and broke the previous high month's record, that of September of this year, by 25 per cent. The ten months' figures for tonnage commodities are more than double those of the corresponding period of 1914 and exceed by nearly 20 per cent the high record for the same months of 1913. The shipments of machinery for the ten months of the current year gained 35 per cent over 1914 and came within less than one per cent of the unbeaten record of 1913.

The exports of iron and steel for which quantities are given aggregated in October 351,128 gross tons, as compared with 147,293 tons for the same month a year ago and 220,545 tons in October, 1913. The total for the ten months ended October was 2,818,999 tons, as compared with 1,291,462 tons for the same period of 1914 and 2,387,455 tons for the corresponding months of 1913. Totals of the exports of tonnage iron and steel in October and for the ten months ended October, 1915, as compared with the corresponding periods of 1914, are as follows:

Exports of Iron and Steel—Gross Tons

	October		Ten Months	
	1914	1915	1914	1915
Pig iron	5,524	21,212	97,538	178,141
Scrap	1,012	17,715	30,289	58,098
Bar iron	679	3,392	4,380	29,986
Wire rods	5,716	13,646	47,311	135 195
Steel bars	9,411	41,455	88,681	337,611
Billets, ingots and blooms n.e.s.	6,771	43,405	40,033	451,306
Bolts and nuts	1,502	2,747	13,321	18,283
Hoops and bands	1,104	3,319	7,748	22,352
Horseshoes	905	597	2,953	14,568
Cut nails	177	374	3,227	3,512
Railroad spikes	477	2,378	6,449	7,230
Wire nails	5,927	8,156	27,354	74,769
All other nails, including tacks	450	1,041	2,555	7,220
Pipes and fittings	.....	.....	a104,487	.....
Cast-iron pipes and fittings	8,264	2,382	b25,529	30,151
Wrought pipes and fittings	9,879	8,454	b39,885	100,685
Radiators and cast-iron house heating boilers	386	195	3,097	1,845
Steel rails	22,057	67,783	161,830	292,677
Galvanized iron sheets and plates	2,740	3,833	32,932	67,851
All other iron sheets and plates	547	3,245	7,014	19,346
Steel plates	9,958	20,297	94,323	186,024
Steel sheets	10,003	8,450	107,467	84,433
Structural iron and steel	12,234	23,338	160,491	189,243
Tin and terne plates	5,950	16,922	50,734	122,031
Barb wire	15,130	19,919	67,723	192,806
All other wire	10,490	16,873	64,111	184,936
Total	147,293	351,128	1,291,462	2,818,999

a Figures are for 6 months, January to June, inclusive.
b Figures cover period since June 30.

MACHINERY EXPORTS

The surprising gains in the exports of machinery for October are even more significant than those noted for September. The total for the month was $15,239,415, as compared with $6,623,539 for the same month of 1914, and $11,363,378 for October, 1913. As in September, the exports of metal-working machinery, which has for many months been the dominating item, showed a decline as compared with the previous month and in October yielded first place to steam engines. Even more significant, however, is the fact that of the thirty-five items enumerated, only five failed to show a gain over the totals of October, 1914. The total for the ten months ended October, 1915, was $107,420,692, as compared with $79,241,696 for the same period of 1914, and $108,585,468 for the ten months of 1913. More than one-third the total for the ten months of 1915 was credited to metal-working machinery, which showed a gain of nearly 250 per cent over the same period of 1914.

The following table shows the total exports of machinery for the month of October and for the ten months ended October, 1914 and 1915:

Exports of Machinery

	October		Ten Months	
	1914	1915	1914	1915
Adding machines	$32,165	$42,901	$1,135,298	$463,659
Air-compressing machinery	21,232	56,070	330,793	467,145
Brewers' machinery	8,565	132	183,352	35,540
Cash registers	89,828	133,802	2,987,480	1,110,065
Parts of	8,230	8,498	52,708	84,141
Cotton gins	1,520	1,400	100,738	49,926
Cream separators	6,761	34,011	275,323	253,301
Elevator and elevator machinery	78,359	113,128	747,274	751,478
Electric locomotives	3,250	.....	578,338	199,270
Gas engines, stationary	20,307	62,927	264,599	420,463
Gasoline engines	232,746	984,729	4,433,646	5,099,973
Steam engines	112,347	3,478,234	3,073,988	7,532,575
All other engines	36,022	105,404	614,130	872,822
Parts of	185,092	510,403	2,377,880	3,744,060
Laundry machinery, power	9,698	9,785	317,483	255,436
All other	23,460	28,592	420,893	215,476
Lawn mowers	13,466	3,769	367,183	259,043
Metal-working machinery (including metal-working tools)	2,110,397	3,236,079	10,537,878	34,187,278
Meters, gas and water	24,604	25,259	122,359	212,427
Milling machinery (flour and grist)	68,281	117,053	796,765	1,943,713
Mining machinery	.....	.....	a3,928,631	.....
Oil-well machinery	230,790	112,977	b998,045	1,117,241
All other machinery	302,262	354,893	b1,541,624	4,330,705
Paper-mill machinery	74,288	71,224	548,427	747,691
Printing presses	79,570	111,923	1,739,370	1,177,432
Pumps and pumping machinery	217,280	362,430	2,589,450	2,660,877
Refrigerating and ice-making machinery	25,379	67,943	509,731	698,847
Sewing machines	622,604	433,228	7,757,421	4,902,594
Shoe machinery	86,397	91,036	959,287	1,233,837
Sugar-mill machinery	183,808	998,432	1,340,216	3,377,566
Textile machinery	90,789	118,473	1,022,264	1,505,092
Typesetting machines	32,072	52,899	1,460,634	391,457
Typewriting machines	240,544	663,898	6,987,727	5,785,373
Windmills	48,078	79,867	987,432	734,392
Woodworking machinery, saw mill	9,629	15,895	446,534	281,736
All other	34,455	213,251	791,106	904,204
All other machinery, and parts of	1,259,264	2,538,870	15,715,689	19,062,837
Total	$6,623,539	$15,239,415	$79,241,696	$107,420,692

a Figures are for 6 months, January to June, inclusive.
b Figures cover period since June 30.

IMPORTS OF IRON AND STEEL

The imports of iron and steel for which quantities are given amounted to 34,317 gross tons in October, 1915, as compared with 22,754 tons for the same period of 1914, and 20,838 tons for October, 1913. The total for the ten months of 1915 was 209,855 tons, as against 257,402 for the same period of 1914, and 264,995 tons for the ten months of 1913.

The following table shows the imports of tonnage commodities for the month of October and for the ten months ended October, 1914 and 1915:

Imports of Iron and Steel—Gross Tons

	October		Ten Months	
	1914	1915	1914	1915
Ferrosilicon	650	370	5,591	4,144
All other pig iron	11,079	7,973	118,209	65,060
Scrap	4,430	10,517	28,923	40,435
Bar iron	1,208	640	15,250	7,235
Structural iron and steel	346	40	8,825	1,242
Hoop or band iron	125	.....	648	.....
Steel billets without alloys	107	34	1,847	1,256
All other steel billets	2,693	892	33,710	8,961
Steel rails	1,299	13,294	19,981	73,940
Sheets and plates	389	116	3,744	1,039
Tin and terne plates	112	15	14,716	2,235
Wire rods	316	406	5,958	4,278
Total	22,754	34,317	257,402	209,855

The Bureau of Foreign and Domestic Commerce has found it impracticable to undertake to report imports of ferromanganese separately prior to the beginning of a new fiscal year, hence this item will not appear in the monthly returns until July 1 next.

W. L. C.

German Steel Shipments Still Small

The German Steel Works Union's October shipments were 257,278 metric tons against 246,840 tons in September, an increase of 10,438 tons. This is the largest output since July. The October shipments were made up of 68,344 tons of semi-finished steel, 130,981 tons of railroad material and 57,953 tons of shapes. The greatest tonnage shipped since the war was last March, when it was 351,560 tons.

Large Exports of Tin Plates

Exports of tin plates from the United States have been more than doubled in recent months. The total for this year to Oct. 1, 1915, is 235,443,867 lb. against only 100,316,478 lb. and 108,910,912 lb. to Oct. 1, 1914 and 1913 respectively. The following table is based on Government data and includes terne plate and taggers tin:

	1913, Pounds	1914, Pounds	1915, Pounds
July	.....	18,397,668	31,013,820
August	.....	11,863,713	49,142,735
September	.....	10,586,995	49,886,814
Nine months ended Sept. 30	108,910,952	100,316,478	235,443,867
Year ended June 30	164,362,281	105,899,762	179,221,644

In 1913 the monthly exports averaged 13,696,856 lb., which compares with an average per month of 26,160,430 lb. to Oct. 1, this year. More marked increases are shown by the figures for July, August and September of this year, averaging 43,347,789 tons per month.

While exports for the nine months this year to Canada have fallen off compared with other years, those to Argentina, Brazil, China, British India, Japan and other countries have increased many fold, as shown by the following table:

	To Oct. 1, 1913, Pounds	To Oct. 1, 1915, Pounds
Canada	87,480,848	60,746,221
Mexico	1,868,144	6,570,279
Cuba	3,576,009	4,646,800
Argentina	846,561	24,481,655
Brazil	3,792,171	12,768,088
China	1,563,290	31,853,831
British India	62,591	12,525,709
Hongkong	560,379	11,111,316
Japan	509,245	11,833,644
Other countries	8,651,696	58,906,324

The increases to South America and to China and Japan are noteworthy.

Automobile Exports Continue to Expand

Automobile exports continue at a large rate, as compared with conditions before the war. The following table, based on Government data, shows the large expansion:

	Commercial Cars	Passenger Cars
July, 1914	50	1,265
July, 1915	2,469	4,118
August, 1914	66	385
August, 1915	1,614	3,839
September, 1914	128	646
September, 1915	2,227	4,299
Nine months ended Sept. 30, 1913	778	20,175
Nine months ended Sept. 30, 1914	637	19,530
Nine months ended Sept. 30, 1915	17,269	31,036
Year ended June 30, 1913	993	24,293
Year ended June 30, 1914	784	28,306
Year ended June 30, 1915	13,996	23,880

In 1913 exports of commercial cars were 1009 and passenger cars 25,880. The very large expansion in commercial cars is striking, increasing as the months go by. It is an interesting fact that the average value of the exports in the first nine months of this year was $2,760 for commercial cars and only $865 for passenger cars, the total for the former to Oct. 1, 1915, being $47,769,216 and for the latter $26,793,972.

Aeroplane Exports Assume Large Proportions

The manufacture of aeroplanes in this country is assuming proportions indicating that the industry is fast becoming a highly important one. The following table of exports of aeroplanes, compiled from Government statistics, is striking:

	Aeroplanes	Total Value	Average Value
July, 1914	2	$4,000	$2,000
July, 1915	138	880,836	6,382
August, 1914	1	1,500	1,500
August, 1915	62	588,600	9,493
September, 1914	5	16,600	3,320
September, 1915	15	101,950	6,796
Nine months ended Sept. 30, 1913	16	48,900	3,056
Nine months ended Sept. 30, 1914	30	169,999	5,666
Nine months ended Sept. 30, 1915	349	2,423,805	6,945

The increase has been from about three per month to Oct. 1, 1914, to nearly thirty-nine per month at present. The advance in values is also striking, signifying an increase in size or in the cost of raw materials, or both. Each machine exported in September averaged in value $6,796, as compared with less than $3,000 a year ago. For the nine months to Oct. 1, 1915, the average value of each aeroplane was $6,945. The values in August, this year, are higher than usual.

The consumption of high-grade steels by this new expanding industry is not insignificant. Prior to the war steels necessary to aeroplane manufacture were imported from Germany, but now the enterprise of some electric and crucible steel makers in this country has produced special grades which fully meet the unusual demands made upon them.

Swedish Iron Ore Goes Freely to Germany

Swedish iron-ore shipments from the port of Lulea amounted to 2,000,000 metric tons to Oct. 1, this year, against 900,000 tons to Oct. 1, 1914, and the total is expected to reach 2,500,000 tons. From the Norwegian port of Narvik, 1,150,000 tons was shipped to Oct. 1, and the total is expected to reach 1,500,000 tons by the end of the year. Exports from these two ports in 1914 were 3,200,000 tons and in 1913 4,400,000 tons. Prices paid are considerably above the average for 1914 and almost the same as for 1913. The London *Iron and Coal Trades Review* says:

> Our imports of Swedish ore are usually only about 600,000 tons. Germany has, of course, received the bulk of the tonnage, with the exception of a few cargoes to the United States, and we arrive at the unpalatable fact that Germany has been able to import all the iron ore she requires, and has been able fully to make up, on her reduced output of pig iron, for the failure of Spanish supplies. * * * Clearly, a remarkable change has taken place in the traffic by the two routes. Instead of Narvik shipping twice as much ore as Lulea, in the past year Lulea has shipped twice as much as Narvick. Our submarine activity comes unfortunately too late, as the bulk of the business until next spring has already been put through, but much may be hoped for from next year's crusade.

Exports of Locomotives and Freight Cars

Exports of locomotives and freight cars are now showing some expansion, due probably to shipments on the large French and Russian orders placed earlier this year. The following table from Government statistics gives the exports for various months in 1914 and 1915, the freight car statistics appearing only in values:

	Locomotives, Number	Freight Cars, Value
July, 1914	12	$161,897
July, 1915	32	496,915
August, 1914	27	91,868
August, 1915	45	388,805
September, 1914	19	83,006
September, 1915	110	535,698
Nine months ended Sept. 30, 1913	383	7,117,742
Nine months ended Sept. 30, 1914	222	1,474,063
Nine months ended Sept. 30, 1915	309	1,892,994

The increase in locomotive exports the last few months is large; to Oct. 1 they exceed those of a year ago, and are not far behind those of 1913. Exports of freight cars, however, are very small, especially as compared with those of similar periods in 1913.

Bounties on the output of iron and steel industries, when started in New Zealand, will be, according to a trade report of New Zealand for 1914 by W. G. Wickman, trade commissioner of the Dominion, at 12s per ton each for pig iron, puddled bar iron and steel produced from pig iron and 24s per ton for steel produced direct from ore.

Spain's pig-iron exports during the war have been large. To Oct. 1, this year, they were 68,726 metric tons against 16,199 tons to Oct. 1, 1914. Exports of finished iron and steel were 30,505 tons for the first nine months of this year against only 1035 tons for the same period last year.

Spain's iron-ore exports for the first nine months of this year were 3,207,677 metric tons against 5,275,046 tons for the same period last year. Manganese-ore exports for the two periods were 7579 and 7908 tons respectively.

Molybdenum in Steel

Details of a series of experiments carried out on molybdenum steels were given before the Institution of Mechanical Engineers (British) recently by Prof. J. O. Arnold of Sheffield University and Prof. A A. Read of the University of Wales. Their paper is entitled "Chemical and Mechanical Relations of Iron, Molybdenum and Carbon" An abstract follows:

The steels investigated were made in the ordinary commercial way in the experimental steel works of the University of Sheffield by the white crucible process with coke fuel. The materials were Swedish "Lancash" bar iron, Swedish white iron and commercially pure molybdenum metal, all charged and melted together. A few minutes before teeming small quantities of metallic manganese and aluminum were added. Five steels were made, the percentage of molybdenum in which was 2.43, 4.95, 10.15, 15.46 and 20.7. The ingots, weighing about 36 lb. each, were cast into molds about 2 in. square. The cold ingots were re-heated and hammered into bars ¾ in. round. All hammered soundly, but as the molybdenum increased an increase in hardness was observed by the hammerman, who also reported the evolution from the yellow hot surfaces of the high molybdenum ingots of yellowish-white fumes, no doubt molybdenum trioxide which deposited as a sublimate on the hammer and tongs.

The bars were annealed with a batch of files by gradual heating in a gas-fired furnace about eight hours until a temperature of 800 deg. C. was reached. This was maintained for an hour and the cooling occupied twenty-four hours. The tensile tests gave similar results for all the steels, though the one with the least molybdenum showed a low yield point and the two with the most molybdenum distinctly higher maximum stresses. Under alternating tests in the Arnold stress-strain machine they all gave exceedingly poor results, confirming Dr. Swinden's conclusion that the mechanical properties of molybdenum steels seriously deteriorate with annealing.

The results obtained on separating the carbides indicated that, at about 18.25 per cent of molybdenum, free carbide of iron disappears and a double carbide of iron and molybdenum is obtained as a fine gray powder insoluble in strong boiling hydrochloric acid. It is not attracted by the magnet, whereas the first carbide isolated from the steel with the lowest molybdenum content was strongly magnetic. The discovery of true ferromolybdenum steels adds three new constituents to the microconstituents of steel—ferromolybdenum pearlite, ferromolybdenum hardenite and ferromolybdenum cementite. Quenched experiments on the 15 per cent steel (carbon 0.79 per cent) show that a transformation of the ferromolybdenum pearlite to its hardenite nearly corresponds with that of tungsten pearlite to tungsten hardenite, beginning at about 925 deg. C., and being completed at 1100 deg. From comparisons of quenched steels, in which the special elements are iron, vanadium, tungsten and molybdenum, it is clear that all four true steels belong to a single genus, though the individual members present startling differences. Throughout the serics there is a soft pearlite which transforms to its hardenite, varying on Moh's scale from 7 to 9 (from quartz to corundum).

Practical Sheffield steel metallurgists estimate that roughly the steel-hardening power of molybdenum is from two to three times as great as that of tungsten, and theoretically, according to data given in the paper, one atom of carbon is about 2.28 times more powerful in producing hardenite in true ferromolybdenum steel than it is in forming the hardenite in true tungsten steel.

Unfortunately, molybdenum is much more erratic in its behavior than tungsten, and the latter, though the less powerful element, still sits unshaken on its throne because of its reliability. A clue to this irregular behavior of molybdenum is found in the astoundingly poor mechanical properties of molybdenum steels compared with corresponding steels containing tungsten. High molybdenum steel quenched at the proper hardening temperature is very brittle. It is clear, therefore, that so powerful a steel-producing element should be used sparingly, avoiding large percentages. With low percentages it undoubtedly exerts a beneficial influence on certain classes of steel when used either per se or to replace about 2½ times its percentage of tungsten.

Judicial Decisions

ABSTRACTED BY A. L. H. STREET

RIGHTS OF BUYERS OF MACHINERY.—If a person orders a certain machine, or other thing, and a different one is delivered and accepted, without objection being made within a reasonable time after he learns the fact, he is bound to pay the agreed purchase price. When a person purchases a thing under a certain warranty, and it fails to comply with the warranty, the purchaser has two remedies: 1. He can return the article within a reasonable time after learning of the breach of warranty and sue for a cancellation of the contract. 2. He can retain the article and recover the difference between the actual value of the article at the time of the purchase and what its value would have been if it had been as represented. (Oklahoma Supreme Court, Spaulding vs. Howard, 152 Southwestern Reporter, 106.)

BULK SALES LAWS VALID.—It is within the power of a State to prevent fraud in the disposition of property by adopting a law such as is in force in Kentucky, providing that sales by a merchant "of any portion of a stock of merchandise, otherwise than in the ordinary course of his trade, or a sale of his entire stock in bulk, shall be fraudulent and void as against the creditors of the seller arising out of said stock of merchandise, unless the purchaser shall, at least five days before the consummation of the sale, in good faith, for the purpose of giving the notice herein required, make inquiry of the seller as to the names and places of residence, or places of business of each and all of the creditors of the seller, arising out of said business," and unless at least five days before the consummation of the sale he shall notify such creditors of the intended sale. (Kentucky Court of Appeals, Dwiggins Wire Fence Company vs. Patterson, 179 Southwestern Reporter, 225.)

BUYER'S LIABILITY FOR PRICE.—The fact that a buyer of goods first rejects delivery does not defeat his liability for the agreed price, if he afterward accepts delivery or receives the net proceeds of a sale made by the carrying railroad company to cover freight charges. (Mississippi Supreme Court, Glacier Metal Company vs. McDonnell Foundry & Machine Company, 69 Southern Reporter, 769.)

ASSIGNMENT OF FUTURE PATENTS.—An agreement to assign patents not yet secured may be enforced when sufficiently definite as to the subject matter, but, if the parties intend to embrace future inventions, language plainly expressing such a purpose must be used. An assignment not plainly embracing future inventions will not be specifically enforced as to the latter. (West Virginia Supreme Court of Appeals, Boone vs. Hess Dustless Mining Machine Company, 86 Southeastern Reporter, 752.)

Morgan Spring Company Adopts Trademark

The Morgan Spring Company, Worcester, Mass., of which company Evan F. Jones is treasurer and general manager, has adopted a trademark showing a "guide post to full value" for use in connection with its products. The company was established in 1881, and its principal output has been wire and springs, but recently it has gone extensively into the manufacture of wire goods and wire specialties on a large scale, and the trademark was conceived as expressive of the idea of a full guarantee for value received on all of the goods manufactured. The company has facilities for drawing the wire used in the various articles. This enables it to select the proper grades of wire.

The regular line of wire, springs and wire specialties has been increased by the addition of wire garment hangers, potato mashers, wire forks, soap dishes, Dover egg beaters, jack chain, safety chain, molding hooks, bird-cage hooks, etc.

A Symposium on Industrial Safety

(*Continued from page 1419*)

fangled notions." This employer is shocked by the horrible details of an accident, but considers himself to be a model of propriety in his own personal relationships. He would resent any insinuation that he was not vitally interested in the welfare of his employees. At the same time he is rather slow to accept new conditions; he believes in all the rights of the "boss." He is averse to publicity methods of accidents; he dislikes criticism or any intimation that there may be anything wrong with the operation of his plant. A large percentage of the owners of small plants may be included in this category. This applies particularly to employers whose businesses are not generally considered to be of an especially dangerous character. Employers in this group have not actively opposed workmen's compensation laws, but are apt to support associations which boost propaganda against radical legislation.

THE THIRD OR PROGRESSIVE TYPE OF EMPLOYERS

The attitude of the third group may be termed that of the progressive type—the pioneers in the accident-prevention movement. The large employers of labor, the leaders in industrial life, and the employer who is himself working earnestly for the welfare of the race, are among those who have taken the lead in making an effort to solve the accident-prevention problem. They are in favor of a fair and equitable workmen's compensation law. They have equipped their plants with sanitary toilets, locker facilities, modern washrooms and recreation centers and do everything within their means to make their work places attractive and comfortable.

This class of employers asks safety engineers to review plans for new shop buildings from the standpoint of safety and comfortable working conditions. Tacitly they confess to their employees that they may not have done their full duty toward them in the past in providing safe working conditions and urge co-operation by encouraging the men to work with them in establishing safe working practices to eliminate as many of the hazards of the industry as may be possible. They organize their workmen into committees for the purpose of getting their suggestions in making conditions safe and carry on a vigorous educational campaign to teach the workmen the real causes and remedies for accidents. These are the employers who reduce accidents in their plants from 25 to 85 per cent and whose efficiency account shows savings up to many million dollars per year. These employers unanimously declare that results are securable from safety work commensurate with the time and effort put into the task. One of them has recently stated that his investment for safety has brought a tangible return of 80 per cent.

The increase in insurance rates for protection from liability under workmen's compensation has brought about a revision in the methods of establishing premium rates, and now through the so-called merit rating system this group of employers realizes the benefits of making their plants safe.

To summarize, from the anciently accepted attitude of indifferent or ignorant acquiescence in accidents has come

I An awakening, caused by
  a publicity that has compelled a realization of the inhumanity and fearful economic waste of accidents
  b the discovery and growing conviction that accidents are preventable.

II The employer has proceeded to prevent accidents
  a impelled by his humanitarian impulses
  b spurred by compensation laws that put the burden and responsibility on the industry and employer, and sweeping away the old outgrown customs and laws

III The result has been
  a a great and gratifying reduction of accidents through mechanical safeguarding and education of workmen
  b the discovery that good safety work has been a big money saver over the old accident conditions.
  c the discovery of the great constructive value of safety work, it proving to be a study of the proper way to accomplish manufacturing results and, therefore, a great aid to industrial efficiency and economy
  d the bringing of employer and employee together on a common ground of mutual interest, thus producing a fellowship and good feeling and cooperation in industry that nothing else could have accomplished.

THE NATIONAL SAFETY COUNCIL

No better evidence could be given of the attitude of employers toward real interest in accident prevention than the development and growth of the National Safety Council. The council was organized by a group of representative employers as the result of a safety meeting held in Milwaukee in 1912. The headquarters of the council were not opened until October, 1913, but within a period of two years this organization has secured a membership of over 1600 employers, representing 150 industries, included within which are 5500 representatives located in every State of the Union except two, and in many foreign countries. These employers have voluntarily joined the council for the purpose of formulating information to promote the cause of accident prevention. Through the dissemination of the collective experience of the members of the council of various methods adopted to eliminate accidents a great deal of light has been thrown upon these problems. The National Safety Council has organized twenty-three active local councils in various parts of the country from San Francisco to Boston. The fourth annual congress was attended by over 1500 employers or their representatives, and for attention and interest this meeting has rarely been excelled.

Some employers predict the most far-reaching effect from the safety organization plan in bringing the employer and employee together into closer relationship by obliterating the class feeling which has kept employer and employee apart. When both sit down at a safety meeting to discuss a problem of common interest there is apt to grow up a better understanding of the aims and purposes of each party. If the employee has imagined in the past that the employer's indifference has been the cause of accidents, he soon learns that the remedy lies principally within himself.

The Discussion

Frederick R. Hutton, emeritus professor of mechanical engineering, Columbia University, New York City, in opening the discussion complimented Mr. Hansen for placing the responsibility for safe conditions around machinery on the engineer. He traced the development of the safety movement from the stage when the effort was to get results from machinery, through that of securing these results efficiently, to the present one of getting them safely. In his opinion the application of the principles of interlocking, such as is used in railroad signal work, and of two-hand operation to start a machine would materially reduce maiming of operatives. He also called attention to the fact that falls were now one of the principal causes of accidents if not the chief one.

John H. Barr, consulting engineer, Remington Typewriter Company, New York, said that safeguards should be included in the equipment of a machine by the builder and that the introduction of a merit rating system in employers' liability insurance would do much toward giving an incentive to secure safeguards. The chaotic conditions prevailing due to conflicts between State laws and different inspection bureaus must be remedied if the accident prevention movement was to succeed as it should.

L. R. Palmer, deputy commissioner of labor of Pennsylvania, pointed out that safety must begin at the top and plants must be properly guarded if results were to be secured. He asked for the co-operation of engineering societies in this work and also in the formulation of a national building code. He believed that the place to make machines safe was on paper in the drafting room and urged the instruction of students in the safeguarding of machinery.

James O. G. Gibbons, engineering department, New York Edison Company, in a written discussion emphasized the point that safety should be considered an important essential of good engineering design.

Dr. Leonard Waldo, consulting engineer, New York City, said that the codification of safety rules was very desirable and that was also true of educational work. New processes and forces in the industrial life of the country, he believed, were responsible for many of the accidents.

Dr. John A. Brashear, president of the society,

mentioned the way in which the saloons followed the establishment of new plants in Pittsburgh and pointed out the influence they exerted in reducing production. He cited a case of an increase of $100,000 a month in the production of the Cambria Steel Company which was due solely to the fact that 400 employees had given up drinking.

Dr. J. F. Patterson, representing Harrison Brothers & Co., the J. G. Brill Company and the Electric Storage Battery Company, Philadelphia, said that prior to the adoption of accident prevention measures, the experience of these companies had been that the curve of industrial accidents was rising rapidly. In the Brill shop alone there were 266 accidents per month on the average with a time loss of 1000 days, now there had been only 480 accidents thus far in 1915 and the time lost was less than 40 days a month. In all three plants the number of accidents and the amount of time lost as a result of accidents had been reduced by guarding the hazards, which alone effected a 20 per cent reduction, and by education.

John Price Jackson, commissioner of the Department of Labor and Industry of Pennsylvania, Harrisburg, Pa., urged the formulation of standards by the American Society of Mechanical Engineers so that the industrial bureaus of the various States would have something to guide them.

Charles Whiting Baker, editor *Engineering News*, New York, emphasized that safety is only a relative term and that accidents will happen so long as fallible human beings and breaking materials are used. Engineers, in his opinion, are best fitted to draw the line between what constitutes safe operating conditions and what does not. He deplored the attacks made by the public press on engineers after accidents occurred and urged engineers to be charitable toward men having accidents. Ignorance of simple well-known principles in many cases was the cause of accidents.

A. L. Williston, principal Wentworth Institute, Boston, Mass., said that while much could be accomplished by guarding machinery and by education, the latter must be individual. He cited the case of a plant using high-speed machinery where a general educational campaign had been inaugurated and instruction sheets covering the operation of some particular machine prepared. These were studied by the workman who was required to pass an examination before being permitted to operate the machine, and in the case of the transfer of a workman from one machine to another the same method was followed, with the result that the number of accidents decreased materially.

William H. Boehm, superintendent flywheel and steam boiler insurance departments, Fidelity & Casualty Company, New York, also approved of individual instruction and mentioned an instance where the boiler insurance risk of a railroad was changed from a very unprofitable one to a profitable one through this method. He also thought that guards should be placed on machinery when it was built.

Calvin W. Rice, secretary of the society, said that in visiting the various student branches he endeavored to arouse interest in the proper guarding of the machinery in the shops of the institution, as he considered it the duty of the professor in charge of the shops to educate the students in safety.

ABRASIVE WHEEL SAFETY CODE

A safety code for the use and care of abrasive wheels was presented at the machine shop session of the society on Dec. 8. It is practically the same as the one presented at the Worcester meeting of the National Machine Tool Builders' Association in April, 1914, and, in the main, recommended by the abrasive wheel manufacturers. The discussion on the code was general, most of the speakers commending the work of the committee in general but taking exceptions, in many cases, to the language as not being specific enough.

The orders of the Russian Iron and Steel Syndicate, the Prodameta, for the first nine months of 1915 are reported as 1,522,000 metric tons, against 1,290,000 tons for the same months in 1914.

Professor Howe's Tribute to the Late Adolphe Greiner

Responding to the request of THE IRON AGE for an estimate of the life and work of Adolphe Greiner, Prof. Henry M. Howe, who knew him well, has written the following:

"The death of Adolphe Greiner, president of the Iron and Steel Institute and head of the great John Cockerill establishment of Seraing, near Liege, removes nearly the last of the striking figures associated with the creation of the age of steel. Starting as an analytical chemist in the laboratory of this concern, and supported solely by his own merits, he rose rapidly to his very high position. Indeed, we may say that in very large part he made the position to which he rose, because it is chiefly through him that his company has reached its very great importance.

"Americans may well take pride in his success, because we have good reason to believe it was due in an important degree to the inspiration which he received from Holley. Certainly few have ever carried out as consistently and intelligently as he that for which Holley stood, the guiding of the art by means of the teachings of science, and an open-handed disclosure of his experience to his competitors. The generosity and breadth of his character led him, as they led Holley, to interpret and to induce generosity and breadth in those with whom he came into contact. His ready sympathy and warm heart made him, as they made Holley, the beloved of an enormous and cosmopolitan circle of friends. With these excellent qualities he indeed combined the shrewdness, boldness, care and thoroughness which have made Belgium so rich and strong.

"His relatively early death, when he was hardly more than at the height of his powers, is one more of the terrible things for which this war is accountable. But for the hardships which his fidelity brought upon him he would naturally have had a long and useful life still before him."

New Officers American Shipbuilding Company

M. E. Farr was elected president of the American Shipbuilding Company, succeeding Edward Smith, deceased, at a meeting of the board of directors held in Cleveland, Ohio, Dec. 9. Mr. Farr is president of the Detroit Shipbuilding Company, a subsidiary, and has been vice-president of the American Shipbuilding Company. O. J. Fish was elected vice-president and retains his former position of secretary and treasurer. Vacancies on the board of directors were filled by the election of A. G. Smith, present general manager, who had not previously been a director; Kellogg Fairbanks and C. L. Strobel of Chicago, who took the places of Chicago men who recently resigned, and Moreau Delano, representing Brown Bros. of New York, investment brokers and bankers, long known as minority stockholders. The office of chairman of the board of directors, which was made vacant by the recent resignation of H. A. Christy of Chicago, was not filled.

The Industrial Bureau of the Columbus, Ohio, Chamber of Commerce has made a canvass to ascertain the amount of finished steel worked up in various shops in that city. Forty-two manufacturers reporting out of 60 who are buyers of finished steel products show an annual consumption of 40,076 tons of bars, 16,605 tons of structural shapes, 35,059 tons of plates, 9861 tons of sheets, 1650 tons of steel billets, and 5000 tons of steel axles. It is estimated that the consumption of those not reporting is 25,000 tons, making a total of approximately 133,000 tons. The Chamber of Commerce is seeking to interest capital in the establishment of an open-hearth steel plant and rolling mill in Columbus.

The Chicago Bridge & Iron Works has moved its general sales office from Washington Heights, Ill., to the Old Colony Building, 37 West Van Buren Street, Chicago, combining with it the city sales office formerly located at 332 South Michigan Avenue.

Steel Corporation Got No Rebates

WASHINGTON, D. C., Dec. 14, 1915.—The Interstate Commerce Commission, in a report to the Senate in response to a resolution passed by the last Congress, declares that "there is no basis for the allegation that wholesale rebates have been paid to the United States Steel Corporation during the period of six years mentioned in the resolution."

Readers of THE IRON AGE will recall that charges to the effect that the Steel Corporation received secret rebates amounting to millions of dollars were made more than a year ago by D. H. Lamar and W. H. Green, who claimed to be in possession of such information. The Senate thereupon ordered an investigation by the commission. It is stated that Lamar and Green were informally invited to state the facts within their knowledge, but declined to do so except at a public hearing, whereupon they were served with subpoenas. Mr. Green was first sworn. Concerning his testimony the commission says that he had no independent information, or indeed any information, respecting the affairs of the Steel Corporation and its subsidiaries that was not already of public record in one form or another. Having referred during his testimony to an individual who was in possession of facts not heretofore known, he at first declined to name him, but being required to state who he was he finally named Mr. Lamar.

Mr. Lamar was then called as a witness and was subjected to an examination as to his information about the relations of the Steel Corporation with the railroads of the country. Concerning his evidence the report says:

> His testimony shows that he knew nothing that was not already generally known to the public, and that such information as he has was of a perfunctory and superficial nature and had been derived from reading the reports of various public bodies, and especially of this commission, in which the affairs of the Steel Corporation are discussed. He named several of the subsidiaries of the Steel Corporation and asserted that "offsets" by which it is understood he meant rebates, had been received from the carriers by the Steel Corporation in the form of dividends on its holdings of stock in these companies, the stock being based, as he asserted, upon an entirely fictitious valuation.

To the extent that Mr. Lamar's testimony was true the commission finds that it is merely a repetition of statements taken from widely published reports by various investigating bodies. In conclusion the commission says:

> The commission comes into constant contact with the records and accounts of railroads and other public carriers through its examiners of accounts, and has reason to believe that there is no basis for the allegation that wholesale rebates have been paid to the Steel Corporation during the period of six years mentioned in the resolution; apparently in alleging that "offsets" and rebates have been received by the Steel Corporation during that period the witnesses mentioned had in mind the dividends on the stock of the numerous subsidiary railroad and steamship lines owned by it, and as to this all the facts have been ascertained and are accessible in the various public records just mentioned.

Under the circumstances the commission expresses the belief that no further investigation is called for by the terms of the Senate resolution. W. L. C.

The Wright Wrench & Forging Company, Canton, Ohio, has changed its name to the American Forging & Machine Company, the new name being more appropriate to the company's present line of products. It has just completed a large addition, which has nearly doubled its capacity, and has added press and hammer equipment to take care of its growing forging business, making forgings instead of wrenches and small tools its principal line of products.

The Department of Commerce, Washington, D. C., has issued a trade directory of Central America and the West Indies, giving the names of importers and merchants. This directory is sold at 60 cents per copy by the Superintendent of Documents, Government Printing Office, Washington, D. C.

Still Working on a Consolidation

Despite statements made last week on behalf of New York financial interests that there was little probability of a merger of independent steel companies because of the high valuations put on various stocks, negotiations are actively going on this week in reference to three companies—Cambria Steel Company, Youngstown Sheet & Tube Company, Lackawanna Steel Company—and possibly one other. If the statements of last week were put out with the object of getting lower prices on the stocks involved they evidently failed of their object. An informal meeting of holders of common stock of the Youngstown Sheet & Tube Company was held at Youngstown, Dec. 14, and it was decided to give options on the common stock of this company at $300 a share, good until Jan. 31. It is not known what financial interests are back of the proposed merger except that the National City Bank of New York has been connected with previous negotiations in which a larger number of companies, including the three mentioned above, were considered. Officers of some of these companies have been at work on the proposition, but there is nothing to indicate at this time whether anything will come of the whole matter. Something like $250,000,000 has been talked of as the capitalization.

For the Cambria Steel Company's stock the syndicate offer talked of is $80 a share, stockholders in that company to have the right to subscribe for stock in the consolidation to the extent of one-half the amount of their Cambria holdings.

Concerning reports in New York connecting the Republic Iron & Steel Company with plans for a consolidation, Chairman John A. Topping made the following statement this week: "Merger rumors concerning the Republic Iron & Steel Company and other steel interests are without any foundation whatever. Under existing conditions the possibilities in this direction are not only remote, but in my opinion the period is inopportune, considering the interests of the stockholders of the Republic Iron & Steel Company."

Steel Corporation Resumes Stock Distribution to Workmen

The United States Steel Corporation announces that its Finance Committee has decided that 35,000 shares of its common stock will be distributed to employees on the terms which have prevailed on previous occasions of this kind. The price will be announced when the formal circular is prepared. The distribution of stock was omitted last year because of the unsatisfactory conditions then prevailing in the steel trade. Since then the matter has been the subject of considerable discussion outside of Steel Corporation circles, and much curiosity has been manifested as to whether it would resume its policy in this respect. The action just taken is an indication that the management feels confident that the steel trade has entered upon a period of continued good business.

Iron and Steel Institute Meetings in 1916

Announcement is made that the annual meeting of Iron and Steel Institute will be held May 4 and 5, 1916, at the rooms of the Institution of Civil Engineers in London. Sir William Beardmore, Bart., will be inducted into the chair as the new president to succeed Dr. Adolphe Greiner who recently died. The Bessemer Gold Medal for 1916 is to be presented to F. W. Harbord, honorary consulting metallurgist to the Minister of Munitions. The autumn meeting will be held at the same place, Sept. 21 and 22, 1916.

The Canadian Locomotive Company, Kingston, Canada, has made the first shipment on its order of fifty locomotives for the Russian Government for use on the Trans-Siberian Railway.

PERSONAL

Dr. D. S. Jacobus

Dr. David Schenk Jacobus, the new president of the American Society of Mechanical Engineers, was born in Ridgefield, N. J., in 1862. He was educated in a private school, then in the Stevens high school where he won by competitive examination a free scholarship in the Stevens Institute of Technology. He was graduated mechanical engineer from the Institute in 1884, and was appointed assistant professor of experimental mechanics, in which capacity he served until 1897, when he was appointed full professor of experimental mechanics and engineering physics. He held that chair until 1906, and from 1900 to 1906 was also in charge of the Carnegie Laboratory of Engineering.

DR. D. S. JACOBUS

At Stevens Institute, Dr. Jacobus developed original apparatus for the illustration of physical laws, and for the testing of various mechanical devices, and perfected the course of experimental mechanics by introducing a much larger participation by the students in practical demonstration. He is still connected with the Institute as a trustee and special lecturer in experimental engineering. He received the honorary degree of Doctor of Engineering from the Institute in 1906.

Since 1906 he has been actively associated with the Babcock & Wilcox Company, maker of water tube boilers, at the head of its engineering department in the position of advisory engineer. He is a member of the American Institute of Mining Engineers, American Institute of Electrical Engineers and the Society of Naval Architects and Marine Engineers and a fellow of the American Association for the Advancement of Science.

John W. O'Leary, vice-president and treasurer of the Arthur J. O'Leary & Sons Company, iron and steel jobber, Chicago, has been elected president of the Chicago Association of Commerce.

Frank H. Johnson, who has been general manager of the West Leechburg Steel Company, announces his resignation to inaugurate a sales service in iron and steel specialties at 604 208 South La Salle Street, Chicago.

Samuel M. Hastings has been re-elected president of the Illinois Manufacturers' Association. The other officers chosen are: First vice-president, William Butterworth, Moline; second vice-president, D. E. Felt; treasurer, Peter S. Theurer; directors, Charles Piez, Alfred Mulliken, William Nelson Pelouze, G. R. Meyercord, Paul Schulze and F. W. Upham.

Charles A. Odegaard, for the last seven years associated with the Marshall & Huschart Machinery Company, Chicago, as salesman and correspondent, has severed his connection with that company and affiliated himself with the Federal Machinery Sales Company, Chicago, mention of whose organization recently appeared in THE IRON AGE. Mr. Odegaard succeeds James Jay Sheridan, resigned, as secretary, the latter retaining his directorship in the company.

Charles E. Duncan, who has been superintendent of the old Cambria works at Johnstown, Pa., has been appointed general superintendent of the Donner Steel Company and has entered upon his duties at Buffalo. He went to Johnstown from the Carnegie Steel Company and previously had been superintendent of the Algoma Steel Company's plant at Sault Ste. Marie, Ont.

J. Norman Sherer of Bellefonte, Pa., has been made superintendent of the blast furnaces of the Reading Iron Company, Reading, Pa., succeeding Albert Broden, who resigned to become identified with the new company which has taken over the furnace of the Temple Iron Company at Temple, Pa.

W. E. Welborne, who has become widely known as a buyer of machinery and related commodities for export, states that the volume of his purchases has so greatly increased since his arrival in this country in October, 1914, that he has decided to establish his business here permanently. His headquarters have heretofore been in the Hotel McAlpin, but he has now taken an office in the South Ferry Building, New York City.

David McLain addressed the Detroit Foundrymen's Association at its meeting in Detroit in Association Hall, Thursday evening, Dec. 9.

George A. Cragin, Worcester, Mass., assistant general sales agent of the American Steel & Wire Company, has resigned after a service of 35 years with that company and its predecessors.

James W. Kellog, chief chemist of the Pennsylvania State Department of Agriculture, has been appointed a member of the committee of the National Association of Feed Chemists to study the feeding quality of refuse middlings of tin-plate mills. The experiments are to determine whether the minute particles of tin which are gathered with the middlings affect it as a foodstuff for cattle.

George B. Woodward, manager for 16 years of the Louisville branch of Fairbanks, Morse & Co., has retired after nearly 50 years in the service of the company. J. F. Snarenberger, who has held the position of assistant manager for six years, is to be manager, succeeding Mr. Woodward. The Louisville branch is in charge of sales in southern Indiana, Kentucky and western Tennessee.

Harvey E. Bloomer, for 16 years chief electrical inspector of Milwaukee and Wisconsin for the Milwaukee Board of Fire Underwriters, has resigned to devote his entire attention to the P. & B. Mfg. Company, Milwaukee, Wis., recently organized to manufacture electrical devices and supplies. The factory is at 189 Fifth Street.

Frederick Peiter has severed his connection as coke oven engineer with the Gas Machinery Company, Cleveland, Ohio. For the past three years he has been engaged in the designing and development of the company's top burner regenerative coke oven. Previous to this he was connected with the H. Koppers Company as designing and constructing engineer and was with the Tennessee Coal, Iron & Railroad Company during the designing and construction of its coke oven plant. Mr. Peiter has several connections in view, but will take a short rest before assuming other responsibilities.

E. T. Causer, who has been factory superintendent of the Mitchell-Lewis Motor Company, Racine, Wis., for nearly four years, has resigned to accept the posi-

tion of works manager of the R. D. Nuttall Company, Pittsburgh, Pa., effective Dec. 15.

M. A. Coolidge, president Fitchburg Machine Works, Fitchburg, Mass., was elected mayor of that city Dec. 7.

Edwin G. Booz, formerly statistician of the Produce Terminal Corporation of Chicago, has recently organized at Chicago the Business Research Service and has been made its director. Its purpose it to supply manufacturers, trade organizations and sales and advertising managers with the results of investigations, particularly as to market conditions in different industries.

Secretary Lane of the Department of the Interior has ordered the transfer of R. B. Marshall, chief geographer of the United States Geological Survey, to the position of superintendent of the national parks, effective at once, and to continue the remainder of the fiscal year. Sledge Tatum has been designated acting chief geographer. He will continue to serve as geographer in charge of the Rocky Mountain division.

OBITUARY

Richard H. Lee

Richard Henry Lee, superintendent of the Lebanon blast furnaces of the Pennsylvania Steel Company and consulting engineer of the American Manganese Mfg. Company, died suddenly Dec. 8 of heart failure, aged 56 years. Mr. Lee had been actively connected with blast furnace management at many places in this country since 1879, when on leaving Lehigh University his father put him in charge of the cold blast charcoal furnaces of the Logan Iron & Steel Company at Burnham and Greenwood Furnace, Pa. He has occupied the following positions in the past 37 years: Logan Iron & Steel Company, 1879-1884, blast furnace superintendent; 1884-1891, assistant general superintendent; 1891-1898, general superintendent. Colorado Fuel & Iron Company, 1898-1899, blast furnace superintendent; 1899-1903, assistant general superintendent. Virginia Iron, Coal & Coke Company, 1903, superintendent furnaces at Middlesbrough, Ky. Alabama Steel & Wire Company, 1904, superintendent Gadsden furnace. Lackawanna Steel Company, 1904-1905, assistant superintendent Buffalo furnaces. Shenandoah Iron Company, 1905-1906, superintendent Liberty furnace. Pennsylvania Steel Company, 1906-1915, superintendent Lebanon furnaces. American Manganese Mfg. Company, 1914-1915, consulting engineer and metallurgist, Dunbar furnace. Mr. Lee was a close student of the literature of blast furnace practice in this country and abroad and a fearless and systematic experimenter. His industry was rewarded by the successful solution of many problems in the manufacture of pig iron, spiegeleisen and ferromanganese. He was unusually quick in meeting the emergencies and minor accidents which so often occur in the operation of blast furnaces, and took keen delight in overcoming such obstacles and in assisting other men in similar troubles. He was noted for freely giving to others the benefit of his technical knowledge and his experience in blast furnace practice. He never deviated from his policy of helping others, although he realized he was thus sometimes imposed upon. In every position he occupied he made warm friends among his employers, associates and the workmen with whom he was brought into intimate contact.

In 1894 he was married to Catharine M. Sheaffer. Their son, Richard Henry Lee, is now a student at Lehigh University. Mr. Lee was a descendant of Richard Lee, prominent in Colonial times, being eighth in direct line, and sixth in direct line of Richard Henry Lee, signer of the Declaration of Independence. He was a member of the American Institute of Mining Engineers, the American Iron and Steel Institute and the Engineers' Society of Western Pennsylvania. His chief contributions appear in the Transactions of the American Institute of Mining Engineers for 1886, 1906, 1912 and 1913, although he was an occasional contributor to the discussion of the papers of others and author of several important articles in the technical press.

RICHARD H. LEE

O. K. HARRY, proprietor of the O. K. Harry Steel Works of St. Louis, Mo., and Dallas, Tex., died Dec. 11, at Dallas, Tex., where he had been for some time in attendance upon his business there. He was 65 years old and had been in the steel business the greater part of his adult life. He leaves his widow and two daughters.

FRANK HOLDER, superintendent of the plant of the Standard Steel Car Company, at Hammond, Ind., was shot and killed by an unknown person Dec. 7 as he was returning to his home from the works. The impression is current that he was the victim of a war fanatic.

CHARLES H. WILLIAMS, for many years vice-president of the Williams Foundry & Machine Company, Akron, Ohio, and brother of J. K. Williams, president of that company, died Dec. 3, aged 58 years.

Marlin Arms Corporation Enters Munitions Field

The Marlin Fire Arms Company, New Haven, Conn., has been bought by the Marlin Arms Corporation, incorporated in New York with authorized capital of $3,800,000. The incorporators are R. L. Bacon, New York City; Edward Park, Larchmont, N. Y., and Louis E. Stoddard, New Haven, Conn. The officers and directors are A. F. Rockwell, Bristol, Conn., president Bristol Brass Company and until recently president of the New Departure Mfg. Company, president and general manager; Edward Park, vice-president; A. P. Taliaferro, treasurer; and Errol Kerr, secretary.

It is understood that another large factory will be erected adjoining the present Marlin factory, the new building to be completed in six weeks. It will contain about 100,000 sq. ft. of floor space.

The Marlin Arms Corporation has secured a license to manufacture Colt rapid-fire guns on a royalty basis and has been given a contract by J. P. Morgan & Co. for 10,000 of these guns, delivery to be begun in February.

At a recent meeting of the board of directors of the Chamber of Commerce of Reading, Pa., a Manufacturers' Bureau was organized with William A. Heizmann, Penn Hardware Company, as president.

The Iron and Metal Markets

ORE AND PIG IRON ACTIVE

Lake and Eastern Iron Ore Heavily Sold

Freight Congestion Advances Coke Prices—Large Rail Sale to France

Current market reports still deal largely with business offered, which steel companies cannot entertain. Yet in November, when a similar condition prevailed, actual bookings were enormous, as the Steel Corporation's increase of over 1,000,000 tons in unfilled orders is full proof. Some independent companies also booked nearly as much as they shipped last month, but others kept their new contracts down.

It is known that some sales for the third quarter of 1916 have been made at 1.70c. to 1.80c. for heavier finished materials, but they are not many. However, no small tonnage of what is now on the books is really third quarter business, since the mills cannot deliver it earlier.

The outcome of the railroad congestion, particularly in the East, is a matter of no small concern. Aggravated in some districts by heavy snow fall it has resulted in a scarcity of coke and some blast furnaces have paid $2.75 and higher for prompt coke as against $2.10 a week ago.

Iron ore, pig iron and finished materials have been active in the past week in the order named. Sales of Lake Superior ores have been very heavy at 75c. advance over 1915 prices as the latter were readjusted after the Minnesota freight rate reduction of 5c. Old range Bessemer is thus $4.50 and non-Bessemer $3.75, while Mesaba ores are $4.20 for Bessemer and $3.55 for non-Bessemer. It is believed practically all the merchant ore that can be shipped will be sold by the end of the month.

Lake ore producers are exercised over the supply of mining labor and this question is now of equal moment with that of vessel room and rates. More boats have been bought by ore shippers to make sure of getting down their ore, nearly a score being thus taken up.

Large sales of Port Henry, N. Y., ores have been made for 1916 delivery at an advance of about 75c. over this year's schedule, making the range 8¼c. to 9c. a unit, delivered in eastern Pennsylvania, according to the grade of ore and the freight rate. Lump ore for open-hearth and puddling furnaces has sold at $4 at Port Henry. Over 1,000,000 tons of Eastern ores has been sold in the past few days.

Pig iron has been making up lately for the months when it held back while steel was climbing. Marked increase in foundry operations is shown by good buying, particularly in the East and in the Lake districts, for early delivery. Pittsburgh and the Valleys have been quiet, but elsewhere buying has been freer at advancing prices. Makers are taking on business for the second half at $1 advance over recent prices. At Buffalo a 25,000-ton block of resale iron has been rapidly disposed of at a profit of $5 to $6 a ton.

Here and there furnaces are withdrawing from the market temporarily. Indications are increasing that a much greater proportion of foundry requirements for the first half of 1916 is uncovered than has been generally accepted.

That the recent halt in contracting for export steel was due to the difficulty of getting shipments on material already ordered appears from the falling off of October exports to 351,000 tons, as against 401,000 tons at the high mark reached in August. Now, however, fresh inquiries are coming out, the Allies' New York agents asking this week for 60,000 tons of wire products, bars and structural material. For France a new inquiry is for 5,000,000 3-in. shells.

In the French rail letting an Eastern mill was given 65,000 tons of standard sections in three weights. About 35,000 tons is yet to be placed. From the Southern Railway the Maryland Steel Company has a 10,000-ton rail order, while the Great Northern has just bought 5000 tons, the Reading 4000 tons and the Buffalo, Rochester & Pittsburgh 2000 tons.

Fabricating shops, it is estimated, took business in November equal to 105 per cent of their capacity, the largest bookings reported since the spring of 1909. The New York subway contracts, 63,000 tons, were over a third of the total.

The wire trade is struggling with a volume of orders indicating overselling. Foreign business accepted in November showed a marked falling off, but much more could have been had. There is every indication of a spring congestion in the domestic trade.

Users of plates complain of the scant shipments on contracts, some large companies appearing to have given other departments good allotments of steel at the expense of plate mills. Sales continue to be made at 2.25c. and 2.35c., Pittsburgh, for shipment within three weeks.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type. Declines in Italics

At date, one week, one month and one year previous

	Dec. 15, 1915.	Dec. 8, 1915.	Nov. 17, 1915.	Dec. 16, 1914.
Pig Iron, Per Gross Ton:				
No. 2 X, Philadelphia...	**$19.50**	$18.25	$17.25	$14.25
No. 2, Valley furnace....	**18.00**	17.50	15.75	12.75
No. 2 Southern, Cin'ti...	16.90	16.90	16.40	12.40
No. 2, Birmingham, Ala.	14.00	14.00	13.50	9.50
No. 2, furnace, Chicago*	18.00	18.00	17.50	13.00
Basic, del'd, eastern Pa.	18.00	18.00	17.50	13.50
Basic, Valley furnace....	17.50	17.50	16.00	12.50
Bessemer, Pittsburgh....	19.45	19.45	17.70	14.70
Malleable Bess., Ch'go*..	18.00	18.00	17.50	13.00
Gray forge, Pittsburgh..	17.95	17.95	15.95	13.40
L. S. charcoal, Chicago..	**19.25**	17.75	17.25	15.75
Billets, etc., Per Gross Ton:				
Bess. billets, Pittsburgh..	30.00	30.00	27.00	19.00
O.-h. billets, Pittsburgh..	31.00	31.00	27.00	19.00
O.-h. sheet bars, P'gh...	31.00	31.00	28.00	20.00
Forging billets, base, P'gh	52.00	52.00	48.00	24.00
O.-h. billets, Phila.....	36.00	36.00	34.00	21.40
Wire rods, Pittsburgh...	40.00	40.00	37.00	25.00

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Dec. 15, 1915. Cents.	Dec. 8, 1915. Cents.	Nov. 17, 1915. Cents.	Dec. 16, 1914. Cents.
Sheets, black, No. 28, P'gh	2.50	2.50	2.25	1.80
Galv. sheets, No. 28, P'gh	4.75	4.75	4.00	2.75
Wire nails, Pittsburgh	2.00	2.00	1.90	1.50
Cut nails, Pittsburgh	1.90	1.90	1.80	1.55
Fence wire, base, P'gh	1.85	1.85	1.75	1.30
Barb wire, galv., P'gh	2.85	2.85	2.75	1.90
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bess. rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia	1.959	1.959	1.759	1.17
Iron bars, Pittsburgh	1.80	1.80	1.60	1.15
Iron bars, Chicago	**1.75**	1.60	1.50	0.95
Steel bars, Pittsburgh	**1.80**	1.70	1.70	1.05
Steel bars, New York	**1.969**	1.869	1.869	1.21
Tank plates, Pittsburgh	1.90	1.90	1.70	1.05
Tank plates, New York	2.169	2.169	1.869	1.21
Beams, etc., Pittsburgh	1.70	1.70	1.60	1.05
Beams, etc., New York	1.869	1.869	1.769	1.21
Skelp, grooved steel, P'gh	1.70	1.70	1.60	1.10
Skelp, sheared steel, P'gh	1.80	1.80	1.70	1.15
Steel hoops, Pittsburgh	1.90	1.90	1.75	1.20
Old Material, Per Gross Ton:				
Iron rails, Chicago	16.00	16.00	15.00	11.00
Iron rails, Philadelphia	19.00	19.00	17.50	13.00
Carwheels, Chicago	14.50	14.50	13.25	9.50
Carwheels, Philadelphia	**15.50**	15.00	14.00	10.00
Heavy steel scrap, P'gh	17.50	17.50	16.00	10.75
Heavy steel scrap, Phila.	**15.75**	15.50	14.50	9.50
Heavy steel scrap, Ch'go	**15.75**	15.00	13.50	8.25
No. 1 cast, Pittsburgh	15.25	15.25	14.00	10.50
No. 1 cast, Philadelphia	**15.75**	15.00	14.50	11.50
No. 1 cast, Ch'go (net ton)	13.75	13.75	12.00	9.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	**$2.75**	$2.10	$2.25	$1.50
Furnace coke, future	2.40	2.40	2.50	1.75
Foundry coke, prompt	2.75	2.75	3.00	1.90
Foundry coke, future	3.00	3.00	3.00	2.15
Metals.				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	*19.75*	19.87½	19.00	13.62½
Electrolytic copper, N. Y.	*19.50*	19.62½	18.87½	13.37½
Spelter, St. Louis	**16.50**	14.75	17.12½	5.65
Spelter, New York	**16.75**	15.00	17.37½	5.80
Lead, St. Louis	**5.25**	5.17½	5.15	3.67½
Lead, New York	**5.40**	5.25	5.25	3.80
Tin, New York	**37.65**	37.25	42.75	34.75
Antimony, Asiatic, N. Y.	39.00	39.00	37.50	13.00
Tin plate, 100-lb. box, P'gh	$3.50	$3.50	$3.30	$3.10

Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16.9c.; Philadelphia, 15.9c.; Boston, 18.9c.; Buffalo, 11.6c.; Cleveland, 10.5c.; Cincinnati, 15.8c.; Indianapolis, 17.9c.; Chicago, 18.9c.; St. Louis, 23.6c.; Kansas City, 43.6c.; Omaha, 43.6c.; St. Paul, 32.9c.; Denver, 68.6c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 73.9c. on plates, structural shapes and sheets and 65c. on wrought pipe and boiler tubes. The foregoing rates to the Pacific coast are by rail. The rate via New York and the Panama Canal is 56.9c.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.80c. to 1.90c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated Feb. 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ⅛ in. thick on edge or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gage or weight to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras	Cents per lb.
Gages under ¼ in. to and including 3-16 in.	.10
Gages under 3-16 in. to and including No. 8	.15
Gages under No. 8 to and including No. 9	.25
Gages under No. 9 to and including No. 10	.30
Gages under No. 10 to and including No. 12	.40
Sketches (including straight taper plates), 3 ft. and over	.10
Complete circles, 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in.	1.00
Cutting to lengths under 3 ft. to 2 ft., inclusive	.25
Cutting to lengths under 2 ft. to 1 ft., inclusive	.50
Cutting to lengths under 1 ft.	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Wire Products.—Prices to jobbers: Fence wire, Nos. 0 to 9, per 100 lb., terms sixty days or 2 per cent discount in ten days, carload lots, annealed, $1.85; galvanized, $2.55. Galvanized barb wire and staples, $2.85; painted, $2.15. Wire nails, $2. Galvanized nails, 1 in. and longer, $2 advance over base price; shorter than 1 in., $2.50 advance over base price. Woven wire fencing, 68 per cent off list for carloads, 67 off for 1000-rod lots, 66 off for less than 1000-rod lots.

The following table gives the price per 100 lb. to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.

Nos.	0 to 9	10	11	12&12½	13	14	15	16
Annealed	$1.90	$1.95	$2.00	$2.10	$2.20	$2.30	$2.40	$2.50
Galvanized	2.80	2.85	2.90	2.95	3.00	3.15	3.50	3.60

Wire Rods.—Bessemer, open-hearth and chain rods, $40.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees 3 in. and over, 1.70c. to 1.90c.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card in effect from Aug. 16, 1915, on steel and iron galvanized pipe, and from Nov. 1, 1915, on steel and iron black pipe, all full weight:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛, ¼ and ⅜	71	46½	⅛ and ¼	63	37
½	75	59½	⅜	63	37
¾ to 3	78	63½	½	67	47
			¾ to 2½	70	52

Lap Weld

2	75	60½	1¼	54	36
2½ to 6	77	62½	1½	65	47
7 to 12	75	58½	2	66	49
13 and 14	61½	..	2½ to 4	68	52
15	59	..	4½ to 6	68	52
			7 to 12	66	50

Reamed and Drifted

1 to 3, butt	76	61½	1 to 1½, butt	68	50
2, lap	73	58½	2, butt	68	50
2½ to 6, lap	75	60½	1¼, lap	52	34
			1½, lap	63	45
			2, lap	64	47
			2½ to 4, lap	66	50

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	66	49½	⅜	60	43
½	71	58½	½	65	51
¾ to 1½	75	62½	¾ to 1½	69	53
2 to 3	76	63½	2 and 2½	70	54

Lap Weld, extra strong, plain ends

2	72	57½	1½	64	48
2½ to 4	74	59½	2	66	49
4½ to 6	73	58½	2½ to 4	68	52
7 to 8	67	50½	4½ to 6	67	51
9 to 12	62	45½	7 to 8	60	44
			9 to 12	55	39

Butt Weld, double extra strong, plain ends

½	61	48½	½	55	40
¾ to 1½	64	51½	¾ to 1½	58	43
2 to 2½	66	53½	2 and 2½	60	45

Lap Weld, double extra strong, plain ends

2	62	49½	2	56	40
2½ to 4	64	51½	2½ to 4	58	45
4½ to 6	63	50½	4½ to 6	57	44
7 to 8	57	40½	7 to 8	50	33

To the large jobbing trade an additional 5 per cent is allowed over the above discounts.

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts on less than carloads, f. o. b. Pittsburgh, freight to destination added, on lap welded steel tubes and standard charcoal iron tubes, effective from Dec. 1, 1915, are as follows:

Lap Welded Steel		*Standard Charcoal Iron*	
1½ in.	47	1½ in.	42 to 43
1¾ and 2 in.	59	1¾ and 2 in.	46 to 47
2¼ in.	56	2¼ in.	43 to 44
2½ and 2¾ in.	62	2½ and 2¾ in.	50 to 51
3 and 3¼ in.	67	3 and 3¼ in.	54 to 55
3½ to 4½ in.	68	3½ to 4½ in.	56 to 57
5 and 6 in.	61	5 and 6 in.	50 to 51
7 to 12 in.	58		

Locomotive and steamship special charcoal grades bring higher prices.

1¾ in., over 18 ft., 10 per cent net extra.

2 in. and larger, over 22 ft., 10 per cent net extra.

Sheets.—Makers' prices for mill shipment on sheets, of U. S. Standard gage, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms thirty days net, or 2 per cent cash discount in ten days from date of invoice:

Blue Annealed Sheets

	Cents per lb.
Nos. 3 to 8	2.20
Nos. 9 to 10	2.25
Nos. 11 and 12	2.30
Nos. 13 and 14	2.35
Nos. 15 and 16	2.45

Box Annealed Sheets, Cold Rolled

	Cents per lb.
Nos. 10 and 11	2.15
No. 12	2.15
Nos. 13 and 14	2.20
Nos. 15 and 16	2.25
Nos. 17 to 21	2.30
Nos. 22 and 24	2.35
Nos. 25 and 26	2.40
No. 27	2.45
No. 28	2.50
No. 29	2.55
No. 30	2.65

Galvanized Sheets of Black Sheet Gage

	Cents per lb.
Nos. 10 and 11	3.75
No. 12	3.85
Nos. 13 and 14	3.85
Nos. 15 and 16	3.95
Nos. 17 to 21	4.10
Nos. 22 and 24	4.30
Nos. 25 and 26	4.45
No. 27	4.60
No. 28	4.75
No. 29	4.90

Pittsburgh

PITTSBURGH, PA., Dec. 14, 1915.

As far as new developments go, the past week has been the least active that the steel trade has had in a long time. This is mainly due to the fact that consumers are covered for four to six months, the mills are sold up for the same period and much of the business now being placed is for delivery at convenience of the mill. There is no abatement in mill operations, which are at a 100 per cent rate. No notable advances in prices were made the past week, the opinion being general that market values are amply high. The export demand for finished iron and steel continues very heavy, but the railroad blockade in the East is so serious that very few shipments consigned to seaboard and for export are being made by local mills. Nearly all the large steel companies have men from their freight department in the East trying to get cars moved, and it is said they are meeting with only slight success. It is still a question of finding mills that can take orders for any reasonable prompt delivery, and the larger steel interests insist that the orders be laid before them before they decide whether to quote or not. Two of the largest local steel companies have practically no material of any kind to sell for delivery before July.

Pig Iron.—There was not much doing locally the past week, sales being confined mainly to foundry iron. The Westinghouse Machine Company bought 4000 to 5000 tons of No. 2 at prices ranging from about $18 up to about $18.50, Valley furnace. The Colonial Steel Company, Pittsburgh, is understood to have closed for 5000 tons of basic iron, equal deliveries to be made in March, April, May and June. It is said that $18 and higher had been quoted on this inquiry. Prices are very firm. We quote: Standard Bessemer iron, $18.50 to $19; basic, $17.50 to $18; malleable Bessemer, $17.25 to $17.50; No. 2 foundry, $18 to $18.50; gray forge, $17, all at Valley furnace. The freight rate for delivery to the Cleveland and Pittsburgh districts is 95c. per ton.

Billets and Sheet Bars.—Inquiry has quieted down, probably because consumers are pretty well covered for some time ahead, and also because it is almost impossible to buy steel in the open market, even when premiums of $3 to $4 per ton are offered over what are considered ruling prices. There is an insistent demand for forging billets, and it is said sales of ordinary carbons have been made at as high as $55, maker's mill. Prices quoted below are for steel for delivery at convenience of the mill. We quote Bessemer billets and sheet bars at $30 to $31, and open-hearth billets and sheet bars at $31 to $32, maker's mill, Pittsburgh or Youngstown districts. We quote forging billets at $52 to $55, for sizes up to but not including 10 x 10 in. and for carbons up to 0.25, the regular extras being charged for larger sizes and higher carbons. Forging billets running above 0.25 and up to 0.60 carbon take $1 per ton extra. Axle billets are held at $48 to $50.

Ferroalloys.—Prices on domestic ferromanganese have advanced, owing to the heavy demand and to the high rates of freight charged on Brazilian ores. Most sellers of domestic are refusing to quote, and it is said one producer is asking as high as $125 at furnace. English 80 per cent ferromanganese is being freely offered at $110, and, it is said, can be obtained at $100, seaboard, but with no guarantee on deliveries. We quote the domestic market on 80 per cent at $120 to $125. Prices of Bessemer ferrosilicon for delivery in second quarter of 1916 are as follows: 9 per cent, $27; 10 per cent, $28; 11 per cent, $29; 12 per cent, $30; 13 per cent, $31.50; 14 per cent, $33.50; 15 per cent, $35.50, and 16 per cent, $38. Seven per cent silvery for same delivery is $24.50; 8 per cent, $25; 9 per cent, $25.50; 10 per cent, $26; 11 per cent, $27, and 12 per cent, $28. All these prices are f.o.b. at furnace, Jackson, Ohio, New Straitsville, Ohio, or Ashland, Ky., each of these points having a freight rate of $2 per gross ton to Pittsburgh. We quote 50 per cent ferrosilicon for delivery through all of 1916 as follows: Up to 100 tons, $85; over 100 tons and up to 600 tons, $84, and over 600 tons, $83, all per gross ton, delivered in the Pittsburgh district.

Plates.—The Carnegie Steel Company has been awarded a Government contract for a very large amount of nickel steel plates and protective deck plates for the two new battleships. No orders of moment for cars were placed the past week, but some fairly large inquiries are out. The Erie has placed 1000 50-ton gondola cars with the Pressed Steel Car Company, and 500 55-ton gondolas with the American Car & Foundry Company. The New York, Ontario & Western is in the market for 450 50-ton coal cars and 100 gondola cars. It is said the National Railways of Mexico will shortly be in the market for a large number of cars. The 1.70c. price on steel plates has about disappeared, and we quote the market at 1.80c. to 2c. for shipment from mill, the price depending on the size of the order and the deliveries wanted.

Structural Material.—No contracts of moment were taken by local fabricators the past week, as they are filled up so far ahead they are not bidding on much of the new work that is coming up. We quote beams and channels up to 15-in. at 1.70c. to 1.80c., f.o.b. at mill, Pittsburgh.

Steel Rails.—Some fair sized lots of standard sections are being placed, and the three rail mills of the Carnegie Steel Company have rolling schedules that will take all the material they can turn out into second quarter of next year. The new demand for light rails is very active, running close to 5000 tons per week. We quote standard section rails of Bessemer stock at 1.25c., and of open-hearth, 1.34c., f.o.b. Pittsburgh. We now quote light rails as follows: 25 to 45 lb. sections, 1.55c.; 16 and 20 lb., 1.60c.; 12 and 14 lb., 1.65c.; 8 and 10 lb., 1.70c., in carloads, the usual advances being charged for less than carloads.

Sheets.—The demand continues abnormally heavy, and consumers are specifying actively against contracts. One leading interest is sold up on blue annealed sheets for six months and other makers have little to offer inside of three to four months. It is said there are only three active sellers of galvanized sheets, and the minimum price is 4.75c. on No. 28, with some makers asking as high as 5.25c. For delivery through first quarter we quote Nos. 9 and 10 blue annealed sheets at 2.25c.; No. 28 Bessemer black, 2.50c., and No. 28 galvanized, 4.75c. We quote Nos. 22 and 24 gage black plate, tin mill sizes, H. R. and A., at 2.30c. to 2.40c.; Nos. 25, 26 and 27, 2.35c.; No. 28, 2.40c.; No. 29, 2.45c., and No. 30, 2.50c. These prices are for carload and larger lots, f.o.b. maker's mill.

Tin Plate.—Makers report the export demand very heavy. A considerable quantity was recently sold at $3.80 per base box, f.o.b. maker's mill, no discount, which is much higher than the domestic price. The

export demand is more than taking up the surplus output over the domestic demand. Contracts for 1916 delivery to domestic consumers are fairly active, prices ranging from $3.50, to the very largest consumers, up to $3.60 per base box. We quote 14 x 20 coke plates at $3.50 to $3.60 per base box for delivery over remainder of this year, and $3.60 per base box for delivery over all of 1916. We quote terne plate, 14 x 20, 8-lb. coating, at $3.40 to $3.50 per box, f.o.b. Pittsburgh.

Railroad Spikes.—Makers report railroad specifications against contracts as coming in at a fair rate, but from jobbers are heavy. Most makers have their output sold up for the next three or four months, and prices are very strong. We quote standard spikes, larger than ½ in., at $2.10; from ½ in. to ⅜ in., $2.20, and 5/16 in. and ⅜-in. diameter, $2.35, per 100 lb., f.o.b. at mill.

Skelp.—Mills are filled for the next three or four months and are turning out more product than ever before. We quote grooved steel skelp at 1.70c. to 1.75c.; sheared steel skelp, 1.80c. to 1.85c.; grooved iron skelp, 2.10c. to 2.15c., and sheared iron skelp, 2.20c. to 2.25c., all delivered to consumers' mills in the Pittsburgh district.

Wire Rods.—No surplus rods can be obtained in this market, local makers using their entire output in their wire mills in an effort to take care of regular customers. Buyers of rods who come here, expecting to place contracts, find they cannot do so as the rod output of the Pittsburgh district is sold for the next five or six months. We quote Bessemer, open-hearth and chain rods at $40, maker's mill.

Wire Products.—A scarcity in supply of wire nails is looming up and it is predicted that prices will go to $2.25 or perhaps $2.50 per keg. The export demand is heavy and local mills are turning away foreign orders for wire nails every day. The domestic demand is also active. Local mills have practically no barb wire or wire nails to sell up to next April. Prices quoted, for delivery at the convenience of the mills and to regular customers only, are as follows: Wire nails, $2; galvanized nails 1 in. and longer taking an advance over this price of $2, and shorter than 1 in., $2.50; plain annealed wire, $1.85; galvanized barb wire and fence staples, $2.85; painted barb wire, $2.15; polished fence staples, $2.15, all f.o.b., Pittsburgh, with freight added to point of delivery; terms sixty days net, less 2 per cent off for cash in ten days. Prices on woven wire fencing are 68 per cent off list for carload lots, 67 per cent for 1000-rod lots, and 66 per cent for small lots, f.o.b., Pittsburgh.

Hoops and Bands.—Consumers are largely covered through first quarter on hoops and bands and are specifying freely against contracts, shipments being heavy. We quote steel bands at 1.70c. to 1.80c., with extras as per the steel-bar card, and steel hoops at 1.90c. to 2c., f.o.b., Pittsburgh.

Shafting.—Local makers have their output sold up for six months or longer, and are not quoting on new orders for delivery before second quarter at least. Specifications from the automobile trade and other consumers are very active. For shipment at convenience of the mills we quote cold-rolled shafting at 50 per cent off in carloads and 45 per cent in less than carloads, f.o.b., Pittsburgh. Premiums of $3 to $5 per ton are offered for prompt shipment.

Iron and Steel Bars.—Makers of iron and steel bars have their output sold for three or four months and premiums of $2 to $5 per ton are offered for steel bars for prompt shipment. Large export orders for steel rounds are being offered to local mills at fabulous prices, which they cannot accept, being unable to make deliveries. The 1.70c. price on steel bars has largely disappeared and 1.80c. to 1.90c. is quoted for second quarter. We quote refined iron bars at 1.80c., and railroad test bars, 1.95c. in carload lots, f.o.b. Pittsburgh. Steel bars from stock in warehouse are selling at 2.25c. and higher.

Cold-Rolled Strip Steel.—The nominal base price is unchanged, but any maker that can promise delivery within sixty days could get possibly up to $4 base. Local makers state they are sold up for the next four or five months, and when they do quote it is for very extended delivery. There is a fair amount of export inquiry. We quote cold-rolled steel, 1½ in. and wider, under 0.20 carbon, sheared or natural mill edge, per 100 lb., $3.50, delivered. Extras are as follows:

0.10 to 0.19 Carbon—1½ In. and Wider

Coils			Lengths 24 In. and Over	
Hard	Soft		Hard	Soft
Base	$0.25	100 and heavier	$0.10	$0.35
$0.05	0.30	0.050 to 0.099	0.20	0.45
0.20	0.45	0.035 to 0.049	0.35	0.60
0.35	0.75	0.031 to 0.034	0.60	1.00
0.45	0.85	0.025 to 0.030	0.85	1.25
0.55	0.95	0.020 to 0.024	1.05	1.45
1.35	1.35	0.017 to 0.019	2.45	2.45
1.75	1.75	0.015 to 0.016	2.85	2.85
2.45	2.45	0.013 to 0.014	3.70	3.70
2.80	2.80	0.012	4.30	4.30
3.15	3.15	0.011	4.65	4.65
3.50	3.50	0.010	5.00	5.00

Extras for soft apply for all intermediate tempers.

Rivets.—Effective from Dec. 9, prices on rivets were advanced $2 per ton. Makers state that costs of raw materials are steadily increasing, the export and domestic demand is enormously heavy, and all of them are back in deliveries. We quote button-head structural rivets, ½ in. and larger, at $2.50, and cone-head boiler rivets at $2.60 per 100 lb., in carload lots, f.o.b., Pittsburgh, smaller lots bringing about 10c. advance.

Nuts and Bolts.—On account of the steadily higher prices for steel bars, and the very heavy export and domestic demand, nuts and bolts have again been advanced about 10 per cent, effective from Dec. 9. It is stated these discounts are for prompt acceptance only and not for long-time contracts. The new discounts are as follows:

Carriage bolts, small, rolled thread, 70 & 12½ per cent off; small, cut thread, 70 & 5; large, 65. Machine bolts with h. p. nuts, small, rolled thread, 70 & 10 & 7½; small, cut thread, 70 & 12½; large, 65 & 10. Machine bolts with c. p. c. & t. nuts, small, 70; large, 60 & 10. Bolt ends, with h. p. nuts, 65 & 10; with c. p. nuts, 60 & 10. Lag screws (cone or gimlet point), 75. Rough stud bolts, 60. Forged set screws and tap bolts, 40. Hot pressed square nuts, tapped or blank, $4.50 off list; hexagon, $4.70 off. C. p. c. & t. square nuts, tapped or blank, $4.00 off; hexagon, $5.25 off. C. p. plain square nuts, tapped or blank, $4.00 off; hexagon, $4.20 off. Semi-finished hexagon nuts, 80 per cent off. Finished and case-hardened nuts, 75 & 10. Rivets, 7/16 in. diameter and smaller, 70 & 10. These prices are delivered in lots of 300 lb. or more where the actual freight rate does not exceed 20c. per 100 lb.

Merchant Steel.—It is practically a question of getting deliveries and not of price. Demand is very heavy. While the mills are making records in output they are still much back in deliveries, and the situation seems to be getting worse. On small lots for shipment at convenience of the mills we quote: Iron finished tire, ½ x 1½ in. and larger, 2.05c. base; under ½ x 1½ in., 2.20c.; planished tire, 2.25c. channel tire, ¾ to ⅞ and 1 in., 2.55c. to 2.65c.; 1 x ⅛ in. and larger, 2.95c.; toe calk, 2.65c. to 2.75c., base; flat sleigh shoe, 2.40c.; concave and convex, 2.45c.; cutter shoe, tapered or bent, 2.95c. to 3.05c.; spring steel, 2.65c. to 2.75c.; machinery steel, smooth finish, 2.45c.

Carwheels.—No large inquiries for steel carwheels are out. The two local makers have their output sold for six months or longer. We quote 33-in. freight carwheels in lots of 1000 or more at $18; 33-in. tender wheels, $21; 36-in. passenger or tender wheels, $25. These prices are based on a 10-in. diameter hub, 50c. extra being charged for 11-in., all f.o.b. Pittsburgh.

Wrought Pipe.—A local mill has taken an order for about 50 miles of 8¼-in. steel pipe, about 2700 tons, for delivery in the Southwest. Specifications for oil country goods are heavier than for a long time, and the new demand for wrought-iron and steel pipe is also heavier. The pipe mills now are running close to 10 per cent of capacity and have a good deal of work ahead. Discounts are firmly held.

Boiler Tubes.—Mills report that the new demand for locomotive tubes is abnormally heavy and for merchant tubes is also quite active. On seamless tubes the two local producers are filled up for six months at least and are out of the market as sellers. No concessions can be had on iron and steel tubes.

Coke.—On account of the congested condition of the railroads, a scarcity of cars has developed and there is

great trouble in moving freight, resulting in a temporary advance in prices of blast-furnace coke for prompt shipment. It has therefore sold up to $2.50 and $2.75 per net ton at oven, with reports that $3 has been done. The demand for contract coke is quiet. Standard makes of blast-furnace coke are held at $2.40 to $2.50 per net ton at oven on contracts for first half. Standard brands of 72-hr. foundry coke for prompt shipment are firm at $2.75 to $2.85 and on contracts from $3 to $3.25 per net ton at oven. The Connellsville *Courier* gives the output of coke in the upper and lower Connellsville regions for the week ended Dec. 4 as 437,251 net tons, an increase over the previous week of 4910 tons.

Old Material.—Embargoes on scrap routed to Monessen and delay in shipments to Butler have largely been removed, and scrap is now moving more freely to these two important consuming points. Prices are very strong, but without material change from last week. Sales are reported of 10,000 to 12,000 tons of heavy steel scrap at $17.50 and up to $18, delivered, also 500 tons of steel borings at about $10.50, delivered. Dealers quote for delivery in the Pittsburgh and nearby districts that take the same rates of freight, as follows, per gross ton:

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh delivery	$17.50 to $18.00
Compressed side and end sheet scrap	16.00 to 16.25
No. 1 foundry cast	15.25 to 15.50
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	13.25 to 13.50
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	17.50 to 17.75
No. 1 railroad malleable stock	15.00 to 15.50
Railroad grate bars	10.75 to 11.00
Low phosphorus melting stock	21.50 to 22.00
Iron car axles	23.50 to 24.00
Steel car axles	26.00 to 26.50
Locomotive axles, steel	23.00 to 23.50
No. 1 busheling scrap	14.50 to 15.00
Machine shop turnings	9.50 to 10.00
Old carwheels	14.00 to 14.50
Cast-iron borings	10.50 to 10.75
*Sheet bar crop ends	17.00 to 17.50
Old iron rails	16.00 to 16.50
No. 1 railroad wrought scrap	17.00 to 17.50
Heavy steel axle turnings	13.00 to 13.50
Heavy breakable cast scrap	13.50 to 14.00

*Shipping point.

The offices of the Sharpsville Furnace Company, formerly operating a blast furnace at Sharpsville, Pa., which is now owned by the Allen S. Davison Company, have been removed from the Leader Building to room 2514 Oliver Building, Pittsburgh.

Chicago

CHICAGO, ILL., Dec. 14, 1915.

Outside conditions of a kind to add to the burdens of the mills in attempting to maintain production at a maximum have begun to appear. Not the least of these troubles is the threat of early coal scarcity. The week was not one of importance with respect to new business. The only railroad inquiry of importance, that of the Great Northern for track fastenings, dwindled to small proportions before being placed. The Burlington is in the market for some bridge steel and 1200 tons of structural material was placed for a power station at Gary. Prices for heavy steel products are almost entirely nominal on the basis of 1.70c., Pittsburgh, the most conspicuous evidences of premiums appearing in connection with sales of plates. Advances are noted in the prices of light rails, bars, sheets—from mill and stock—bolts and nuts. In the pig-iron market, books have been opened for the last half of 1916 at the level of prices now current. Inquiry reveals a persistent demand, a part of it clearly indicating melt increased beyond anticipations. Iron from the South has been advanced to $15 by some makers. Scrap prices climbed another notch under the influence of steady buying here and strength in tributary markets.

Pig Iron.—There are many evidences that the consumption of pig iron is steadily growing. In no small number of instances deliveries originally scheduled for forward shipment are being advanced as much as possible. Of this one of the largest buyers presents a conspicuous example, contemplating as it does additional purchases to replace second quarter iron which it is asking to have shipped as soon as possible. While there has been a slight decrease in the volume of inquiry, there is still a substantial tonnage up for figures, as compared with the available iron. For Southern iron $15 at Birmingham is now being asked by a few makers and some sales have been made on that basis. For local iron, $18 at the furnace continues to rule, which may be taken as indicating that the advance in ore prices had already been discounted. This fact is further emphasized by the booking of several thousand tons of iron for last half at the same price. The taking of contracts for last half delivery seems not to have become general, but some of the furnaces, at least, are in a receptive mood. Lake Superior charcoal has been advanced $1.50. The low-phosphorus iron market presents a considerable variation in prices, depending somewhat on the deliveries desired. For second and third quarter shipment approximately $32, Chicago, has been done, but for prompt shipment some quotations run as high as $38. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace, and do not include a switching charge averaging 50c. per ton:

Lake Superior charcoal, Nos. 2 to 5	$19.25 to $19.75
Lake Superior charcoal, No. 1	19.75 to 20.75
Lake Superior charcoal, No. 6 and Scotch	20.25 to 21.25
Northern coke foundry, No. 1	18.50 to 18.75
Northern coke foundry, No. 2	18.00 to 18.25
Northern coke foundry, No. 3	17.50 to 17.75
Southern coke, No. 1 f'dry and 1 soft	19.00
Southern coke, No. 2 f'dry and 2 soft	18.50
Malleable Bessemer	18.00 to 18.25
Standard Bessemer	18.50
Basic	18.00
Low phosphorus	32.00 to 36.00
Silvery, 8 per cent	26.50
Silvery, 10 per cent	27.50

Rails and Track Supplies.—The placing of a number of miscellaneous orders for rails is noted, but no new transactions of importance have been consummated. The Great Northern Railway, on an original inquiry for 1,000,000 tie plates and 4000 kegs each of spikes and bolts, has placed a small order for water shipment. Light rail prices at Chicago have been advanced nearly $2 per ton. We quote standard railroad spikes at 2.10c., base; track bolts with square nuts, $2.50c., base, all in carload lots, Chicago; tie plates, $36, f.o.b. mill, net ton; standard section, Bessemer rails, Chicago, 1.25c., base, open hearth, 1.34c.; light rails, 25 to 45 lb., 1.43c.; 16 to 20 lb., 1.48c.; 12 lb. 1.53c.; 8 lb., 1.58c.; angle bars, 1.50c., Chicago.

Structural Material.—Reports of four to six weeks' delivery from an Eastern mill, for shapes in the larger sizes, are the only exception to a situation almost entirely corralled. There appears to be but little structural steel available for prompt shipment even at premium prices, if one may judge from the amount of inquiry that is unsatisfied. Aside from the needs of the carbuilders, there is a continuous pressure for material from the bridge shops. The Burlington is inquiring for about 2000 tons of bridge steel, and the Chicago Great Western is in the market for 500 center sills. The only large job of fabricating placed last week provides for a new power house at the Gary works of the Illinois Steel Company, for which the American Bridge Company will furnish 1200 tons. The A. Bolter's Sons Company will fabricate 225 tons for a storage building for the Chicago *American* and the Spuck Iron & Foundry Company, 240 tons for a rolling-mill building for the Western Cartridge Company, East Alton, Ill. For such orders as are taken, prices vary from 1.80c. to 2c., Pittsburgh, and we quote on that basis for Chicago delivery, although the nominal quotation continues to be 1.889c.

We quote for Chicago delivery of structural steel out of stock 2.30c.

Plates.—Negotiations for plates are continuing to indicate better than any other transactions the status of the finished steel market expressed in terms of premiums obtainable. Sales which include 500 tons at 2c., Pittsburgh, and a similar quantity at 2.25c., Cleveland, are instances of the general range of quotations.

At such prices deliveries within three weeks are being made. There is no small criticism directed at those mills which have been unable to supply customers' needs where the turning out of other products has been permitted to interfere with the rolling of plates. Noting that premiums of $6 to $10 per ton are common, we continue to quote nominally for Chicago delivery of plates from mill 1.889c.

We quote for Chicago delivery of plates out of stock 2.10c.

Sheets.—It is reported that on an inquiry for galvanized sheets submitted to twenty-nine manufacturers, but three quotations were received. Where the mills are considering business at all, quotations for galvanized sheets range from 4.50c. for the heavier gages, to 5c. for the lighter. With respect to black sheets, the situation is not much better, the available supply being sufficiently limited to admit of shipments being made from Chicago mill back to Ohio, material bearing a freight charge of 28c. We quote for Chicago delivery from mill, No. 10 blue annealed, 2.439c.; No. 28 black, 2.689c.; No. 28 galvanized, 4.689c. to 5c.

For galvanized sheets out of stock, the price has been advanced on the lighter gages $4 per ton, while for black sheets an advance of $3 is announced. We quote for Chicago delivery from jobbers' stock as follows, minimum prices applying on bundles of 25 or more: No. 10 blue annealed, 2.60c.; No. 28 black, 2.90c.; No. 20 and heavier galvanized, 4.90c.; No. 22 and lighter, 5c.

Bars.—Bar-iron manufacturers have advanced their prices to 1.75c., Chicago, and are continuing to pursue a policy of choosing from the business offered, despite the fact that the tonnage coming up is not especially heavy. High-carbon steel bars are being sold at prices as high as 2c., but the minimum quotation of 1.80c. can still be encountered. We quote mill shipments, Chicago, as follows: Bar iron, 1.75c.; soft steel bars, 1.889c.; hard steel bars, 1.80c. to 2c.; shafting, in carloads, 50 per cent off; less than carloads, 45 per cent off.

We quote store prices for Chicago delivery: Soft steel bars, 2.20c.; bar iron, 2.20c.; reinforcing bars, 2.20c., base, with 5c. extra for twisting in sizes ¼ in. and over and usual card extras for smaller sizes; shafting 40 per cent off.

Rivets and Bolts.—Earlier contracts for bolts have now become so valuable to many consumers, as contrasted with the current market, that specifications are being sent in very heavily. With very few exceptions the bolt plants are well filled. Such exceptions as exist are responsible for the more liberal discounts at which some first-quarter business is being placed. Further indication of the strength of the situation is had in the announcement of another advance in prices, in accordance with which we have revised our discounts and quote new prices as follows: Carriage bolts up to ⅝ x 6 in., rolled thread, 70-12½; cut thread, 70-5; larger sizes, 65; machine bolts up to ⅝ x 4 in., rolled thread, with hot pressed square nuts, 70-10-7½; cut thread, 70-12½; larger sizes, 65-10; gimlet point coach screws, 75; hot pressed nuts, square, $4.70 off per cwt.; hexagon, $4.50 off per cwt. Structural rivets, ¾ to 1¼ in., 2.60c. to 2.65c., base, Chicago, in carload lots; boiler rivets, 10c. additional.

We quote out of store: Structural rivets, 2.60c.; boiler rivets, 2.70c.; machine bolts up to ¾ x 4 in., 75; larger sizes, 65-10-5; carriage bolts up to ⅝ x 6 in., 70-10; larger sizes, 65-10 off; hot pressed nuts square, $5.40, and hexagon, $5.70 off per cwt.; lag screws, 75-15.

Cast-Iron Pipe.—The 12,000 tons of large pipe awarded at Chicago was placed with the United States Cast Iron Pipe & Foundry Company, the remainder, amounting to about 7500 tons, going to the American Cast Iron Pipe Company, which manufacturer will also furnish the 2250 tons at Minneapolis. Nearly 700 tons at Sheboygan, Wis., was placed with James B. Clow & Son. At Atkinson, Ill., 350 tons is to be purchased. We quote as follows per net ton, Chicago: Water pipe, 4 in., $29.50 to $30; 6 in. and larger, $27.50 to $28, with $1 extra for class A water pipe and gas pipe.

Old Material.—The steady buying of steel scrap and the sharp strengthening of Eastern markets have sustained the strength of local prices and have been responsible for a number of advances. For rolling-mill and foundry grades of scrap, the demand appears to have slightly moderated, following liberal receipts by consumers against outstanding orders. There seems unmistakably in sight a period of continuous buying of enough scrap to insure an extended period of high prices. Late offerings of railroad scrap include 6000 tons from the Northern Pacific, of which 2000 tons is rerolling rails, 2500 tons from the Great Northern, 1750 tons from the Michigan Central, 700 tons from the Omaha and 1000 tons from the St. Paul. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Old iron rails	$16.00 to $16.50
Relaying rails	19.50 to 20.50
Old carwheels	14.50 to 14.75
Old steel rails, rerolling	16.75 to 17.25
Old steel rails, less than 3 ft	16.50 to 16.75
Heavy melting steel scrap	15.75 to 16.25
Frogs, switches and guards, cut apart	15.75 to 16.25
Shoveling steel	15.25 to 15.75
Steel axle turnings	10.75 to 11.25

Per Net Ton

Iron angles and splice bars	$16.50 to $16.75
Iron arch bars and transoms	17.25 to 18.00
Steel angle bars	13.75 to 14.25
Iron car axles	19.50 to 20.00
Steel car axles	21.50 to 22.00
No. 1 railroad wrought	15.25 to 15.75
No. 2 railroad wrought	14.25 to 14.75
Cut forge	14.25 to 14.75
No. 1 busheling	13.25 to 13.50
No. 2 busheling	9.25 to 9.50
Pipes and flues	12.00 to 12.50
Steel knuckles and couplers	15.00 to 15.50
Steel springs	16.00 to 16.50
No. 1 boilers, cut to sheets and rings	11.00 to 11.50
Boiler punchings	13.75 to 14.25
Locomotive tires, smooth	15.25 to 15.75
Machine shop turnings	8.75 to 9.00
Cast borings	7.75 to 8.00
No. 1 cast scrap	13.75 to 14.25
Stove plate and light cast scrap	11.00 to 11.50
Grate bars	11.00 to 11.50
Brake shoes	10.25 to 10.75
Railroad malleable	13.75 to 14.00
Agricultural malleable	11.50 to 12.00

Philadelphia

PHILADELPHIA, PA., Dec. 14, 1915.

With a view of gaining an opportunity to reduce the tonnage it has on its books a leading maker of plates in eastern Pennsylvania is asking 2.50c., Philadelphia, or 2.659c., Philadelphia, of all new comers. The quotations for structural shapes are unchanged, and the week has been slower in point of orders, but the lull is regarded as one to be expected after heavy buying, during which prices have advanced and deliveries moved further forward. With all the turning down of new business and the many statements that mills have nothing to sell, it should be remembered that all are taking care of their old customers and not letting them drift away or become too much offended. Not a few specifications for last-quarter deliveries will be carried into next year, and deliveries on these will protect consumers until their new contracts become operative. Pig iron continues to advance, and there is great effort to buy ahead; some buyers seeking to place business for the third quarter when, ordinarily, they do not provide for more than three months. The Norfolk & Western Railroad is inquiring for 10,000 tons for last half. Eastern Pennsylvania mills are not buying heavy melting steel, but brokers are paying high prices for Western shipment. Railroad wrought is in active demand, and foundries are buying more cast scrap.

Pig Iron.—With the improvement in general business, the foundry trade is finding greater need for pig iron, and in many cases is anticipating its needs and asking that deliveries on contracts be hurried. Some of the founders who ordinarily buy three months ahead now want to buy nine months off, a tendency undoubtedly inspired by the opinion that pig iron will continue to advance, as well as by a belief that it may become very scarce. The minimum quotation for one brand of eastern Pennsylvania No. 2 X is $19, furnace, or about $19.75, Philadelphia, and several sales have been made at this price, first-quarter delivery. Other producers are asking up to $20, delivered. Virginia iron has been active, and for No. 2 X, $19.75 has been paid, although some resale iron has been offered at

about $19, delivered. One furnace continues out of the market entirely, and the situation may be further judged from the fact that another Virginia producer sold 60,000 tons last month and has unfilled orders aggregating 175,000 tons. Virginia No. 2 plain is quoted at $19.25, Philadelphia. The Norfolk & Western is inquiring for almost 10,000 tons of miscellaneous grades, including 5300 tons of Nos. 1, 2 and 3 foundry, 500 tons of charcoal iron and 3000 tons of Bessemer, all for last-half delivery. A few other large inquiries are before the trade, though some of them are tentative. A stove manufacturer is inquiring for a round tonnage. Basic has been quiet except for two transactions, each involving 1000 tons of Western iron, first-quarter delivery, the price being $18.50, delivered. Standard low phosphorus is unchanged at $32, delivered, but the market is quiet, as might be expected when the producers are comfortably filled with orders, and the requirements of consumers covered for the present. Makers have been called on, nevertheless, to quote on third-quarter and last-half deliveries. Producers take the position that in quoting on these deliveries they are taking more risk than the buyer. Quotations for standard brands, delivered in buyers' yards, prompt shipment, range about as follows:

Eastern Penna., No. 2 X foundry	$19.50 to $20.00
Eastern Penna., No. 2 plain	19.25 to 19.75
Virginia, No. 2 X foundry	19.00 to 20.00
Virginia No. 2 plain	.... 19.25
Gray forge	17.25 to 17.75
Basic	18.00 to 18.50
Standard low phosphorus	.... 32.00

Iron Ore.—No imports of foreign ore are reported for the week ended Dec. 11. The cost and difficulties of ocean transportation are such that consumers do not show much interest.

Ferroalloys.—The market for foreign 80 per cent ferromanganese is strong at $100, seaboard. A domestic maker has sold at $110, but now is considering $125. The report that shipments of manganese ore from Brazil will cease to come is declared to be without foundation by an authority. He states that many thousands of tons are on dock waiting for cargo space and that the latter is merely a matter of price. A shipment of 255 tons of ferromanganese arrived from England last week.

Bars.—Leading makers continue to assert they have no steel bars to sell, and that they cannot make quotations. They are, nevertheless, taking care of their old customers. The nominal quotation is 1.959c., Philadelphia, over which premiums are paid where the bars can be found. Carload lots of iron bars are unchanged at 1.959c., Philadelphia, and less than carloads at 2.009c. The demand is heavy and growing.

Plates.—The complaint of a leading mill is that, although it has steadily advanced prices with a view to checking demand, it finds that almost any price is accepted and it is therefore unable to catch up on its obligations. Consequently the company has sent instructions to its branches to do the best that can be done for old and steady customers, but to talk 2.50c., Pittsburgh, or 2.659c., Philadelphia, to all others, with the hope that its tonnage booked may be cut down. With another mill 2.359c., Philadelphia, can be done.

Structural Material.—Eastern Pennsylvania mills are asking 2c., Pittsburgh, or 2.159c., Philadelphia, and declare this level to be their minimum. On small lots 2.25c., Eastern mill, is asked. The week has been less active. The smaller buying is attributed to the high prices and the far-off deliveries. The mills are so crowded, however, that they welcome a lessening of the pressure upon them, especially in view of the fact that from now to the end of the year specification against contracts which expire Jan. 1 will be heavy. These contracts were taken at considerably under prevailing prices. No new propositions worthy of note are reported. The American Bridge Company was low bidder on the additional 2500 tons required by the Frankford elevated line on which bids were opened today. One bid was $249,000, and the alternate bid, $257,475, the latter including work not shown in the plans.

Billets.—Conditions are unchanged; several of the mills being out of the market, and prices uncertain. Where found, open hearth rolling billets probably wou command $35 to $40, delivered, and forging billet $45 to $55, according to specifications.

Sheets.—Makers of sheets in this territory contin to ask 2.40c., Pittsburgh, or 2.559c., Philadelphia, for N 10 blue annealed.

Coke.—The inquiry for foundry coke continues a tive, and there is a little business in spot furnace cok Foundry, prompt and contract, is quoted at $3 to $3. per net ton at oven. Prompt furnace is quoted at $2. to $2.40 per net ton at oven, and contract at $2.25 $2.50. Freight rates from the principal producing di tricts follow: Connellsville, $2.05; Latrobe, $1.85, a Mountain, $1.65.

Old Material.—The mills in this district are we supplied with heavy melting steel and are not buyin but brokers have paid $16 for shipment to the Wes Information received here is to the effect that th brokers are paying high prices in New England an New York, $15 having been proffered at Boston. Rai road wrought is strong and active, following a goo demand from the rolling-mill trade. Cast scrap is i good demand from the foundries, a direct result o the higher prices for pig iron. Quotations for deliver in buyers' yards in this district, covering eastern Penn sylvania and taking freight rates from 35c. to $1. per gross ton, are as follows:

No. 1 heavy melting steel	$15.75 to $16.25
Old steel rails, rerolling	17.75 to 18.50
Low phos. heavy melting steel scrap	21.00 to 21.50
Old steel axles	.... 25.00
Old iron axles	25.00 to 26.00
Old iron rails	19.00 to 19.50
Old carwheels	15.50 to 16.00
No. 1 railroad wrought	20.00 to 20.50
Wrought-iron pipe	14.00 to 14.50
No. 1 forge fire	12.50 to 13.00
Bundled sheets	12.50 to 13.00
No. 2 busheling	10.50 to 11.00
Machine shop turnings	10.75 to 11.25
Cast borings	10.75 to 11.25
No. 1 cast	15.75 to 16.25
Grate bars, railroad	12.50 to 13.00
Stove plate	11.50 to 12.00
Railroad malleable	14.00 to 14.50

Cleveland

CLEVELAND, OHIO, Dec. 14, 1915.

Iron Ore.—The aggregate of sales made since th establishment of prices at an advance of 75c. a ton a week ago, is very large and considerable business i still being closed. Reservations made before the nam ing of prices are being converted into contracts as rapid ly as possible. It is probable that the heavy buyin will be over by the end of this month. The volume o business indicates, as expected, a heavier demand fo ore next year than during 1913, when the movement reached approximately 50,000,000 tons. While som consumers are buying no more than they did in 1913 others are placing considerable larger orders. Sales i the East so far have been light. The price advanc has been favorably received by consumers, some o whom have stated that had the price been made $1 pe ton above the 1915 basis they would have bought con siderably less ore than they are now taking. On large interest has disposed of nearly all the ore it ha succeeded in securing vessel capacity for and other will probably be sold up to the extent of their vesse capacity before the end of the year. The labor situa tion in the Lake Superior mines may become quite seri ous in the next few months. At present miners are no any too plentiful, and with the resumption of opera tions in closed-down properties and increasing the out put in other mines a shortage of labor is not improb able. Mining companies did not wait for the buyin movement to start in to increase their operations, som underground properties having started up with a ful force Dec. 1. Stock piles at the mines are well cleane up, largely as a result of the increased demand for or that set in about Aug. 1. The 1916 prices for ore are quoted on the same price basis as prevailed this year the guarantee being 55 per cent of iron content, natural for Bessemer and 51.50 per cent for non-Bessemer ore We quote the newly established prices as follows, de livered at lower lake ports: Old range Bessemer, $4.50

Mesaba Bessemer, $4.20; old range non-Bessemer, $3.75; Mesaba non-Bessemer, $3.55.

Pig Iron.—In spite of a rather inactive market prices continue to advance and furnaces are so well sold up that many are avoiding taking additional orders for the first half. One Cleveland interest has advanced its price at all its furnaces to $19 for all grades. In the valleys, foundry iron is very firm at $18 for No. 2, and some Cleveland iron has been sold at that price for shipment to a near valley point. Local sales include a 5000-ton lot of basic iron. Southern iron is fairly active in small lots, several of which have been sold at $14.50, Birmingham, for No. 2. Prices on Ohio silvery iron have been advanced $1 a ton and low phosphorus iron, which is fairly active, is $1 a ton higher. We quote, delivered Cleveland, as follows:

Bessemer	$19.95
Basic	18.30
Northern No. 2 foundry	18.30
Southern No. 2 foundry	$18.00 to 18.50
Gray forge	17.80
Jackson Co. silvery 8 per cent silicon	26.62
Standard low phos., Valley furnace	31.00

Coke.—The market is dull, the only sales being small lots of foundry coke which is quoted at $3 to $3.50 per net ton at oven for the best makes for prompt shipment and contract. We quote Connellsville furnace coke at about $2.25 for prompt shipment and $2.35 to $2.50 for contract.

Finished Iron and Steel.—New inquiry has fallen off somewhat, but this is attributed largely to the fact that few of the mills have anything to sell. The high prices, particularly on plates, is causing the postponement of some projected work. One of the Cleveland mills has advanced its price for plates to 2.50c., Pittsburgh, for prompt shipment and has taken some business at that price. Eastern mills are quoting plates at 2.20c. and higher, Pittsburgh, for early shipment and structural material at 2.25c. Some quotations for steel bars, plates and structural material for future delivery are being made at 1.80c., Pittsburgh. Hard steel bars have advanced $3 a ton to 1.75c., Pittsburgh. Iron bars are firm at 1.80c., Pittsburgh. Local mills have taken some bar-iron business for export to Japan, and we note the sale of 100 tons of steel bars out of warehouse for export to the same country. New structural inquiry is not active. The Massillon Bridge & Structural Company has taken 250 tons for work at the plant of the Cleveland Furnace Company, which will include the erection of two single-track trestles and ore and stone bins, and 110 tons for a building for the East Ohio Gas Company. The Missouri, Kansas & Texas Railroad has an inquiry out for 400 tons of structural material for bridge work. A new factory building to be erected in Detroit by the Buick Motor Car Company will require 2000 tons. The demand for sheets is active, and prices are very firm. Some of the mills are entirely sold up for the first quarter. We quote sheets at 2.50c. to 2.75c., Ohio mill, for No. 28 black, 2.25c. to 2.50c. for No. 10 blue annealed, and 4.75c. to 5c. for No. 28 galvanized. Warehouse business is very heavy. We quote steel bars, plates and structural material out of stock at 2.50c., 2 in. and larger rounds at 3c., and 2 in. and larger squares at 2.65c.

Bolts, Nuts and Rivets.—Advances on bolts and nuts have been made, ranging from 5 to 10 per cent, and an advance of $2 a ton has been made on rivets. The demand for bolts and nuts is very heavy and plants are getting further behind on deliveries. Some makers are refusing to sell except for prompt shipment. Others are taking first-quarter contracts at the new price. The demand for rivets continues heavy. We quote rivets at 2.50c., Pittsburgh, for structural and 2.60c. for boiler rivets for carload lots for delivery through the first quarter. Bolt and nut discounts are as follows:

Common carriage bolts ⅝ by 6 in., smaller or shorter, rolled thread, 70 and 12½, cut thread, 70 and 5, larger or longer, 65; machine bolts with h. p. nuts, ⅝ x 4 in., smaller or shorter, rolled thread, 70, 10 and 7½, cut thread, 70 and 12½, larger and longer, 65 and 10; lag bolts, gimlet or cone point, 75, square h. p. nuts, blanked or tapped, $4.50 off list; hexagon h. p. nuts, blanked or tapped, $4.70 off; c. p. c. and t. square nuts, blank or tapped, $4 off; hexagon nuts, all sizes, $5.25 off; cold pressed semi-finished hexagon nuts, all sizes, 80 off.

Old Material.—The market has quieted down, but prices are very firm. Heavy melting steel is 50c. a ton higher in the local market, and malleable scrap, old car wheels and cast scrap have been marked up about 50c. The heavy foreign demand has well cleaned up steel car axles, and scarcely any of these are now to be had. Transactions are almost wholly between dealers, although some small-lot sales are being made at mills. Dealers do not look for much buying by consumers before Jan. 1. We quote, f.o.b., as follows:

Per Gross Ton	
Old steel rails	$15.00 to $15.25
Old iron rails	17.00
Steel-car axles	23.00 to 24.00
Heavy melting steel	15.50 to 16.00
Old carwheels	12.50 to 13.00
Relaying rails, 50 lb. and over	22.50
Agricultural malleable	13.50 to 13.75
Railroad malleable	16.00 to 16.25
Steel axle turnings	12.50 to 12.75
Light bundled sheet scrap	11.75 to 12.00
Per Net Ton	
Iron car axles	$20.00 to $21.00
Cast borings	7.25 to 7.50
Iron and steel turnings and drillings	6.75 to 7.00
No. 1 busheling	12.25 to 12.50
No. 1 railroad wrought	14.50 to 15.00
No. 1 cast	13.00 to 13.50
Railroad grate bars	9.75 to 10.00
Stove plate	9.50

Buffalo

BUFFALO, N. Y., Dec. 14, 1915.

Pig Iron.—With the exception of the interests engaged in marketing resale iron, the producers of the Buffalo district have materially stiffened their prices within the past few days. These furnaces are rigidly holding a minimum of $19 to $20, but they are practically sold up over the first half. The existence of the other iron keeps the minimum for the time being at $17; so the quotations for the week cover an unusual spread. The sales for the week were made up largely of the resale iron, aggregating about 25,000 tons, but there is not a very large amount remaining to be sold. The demand to cover emergency business amounts to a considerable total, as the average melt of most of the foundries of the district is increasing. The New York Car Wheel Company, Buffalo, has secured contract for 11,000 tons of cast-iron segments for the Fourteenth Street tunnel, New York, and the pig-iron requirements, 12,000 tons covered by option, will, it is expected, go to a Buffalo furnace. We quote as follows, in accordance with conditions set forth above, for current and first-half delivery, f.o.b. furnace, Buffalo:

No. 1 foundry	$18.00 to $20.00
No. 2 X foundry	17.50 to 20.00
No. 2 plain	17.00 to 20.00
No. 3 foundry	17.00 to 20.00
Gray forge	17.00 to 20.00
Malleable	19.00 to 20.00
Bessemer	20.00
Basic	20.00
Charcoal, regular brands	21.00 to 22.00

Finished Iron and Steel.—With a number of the leading selling agencies out of the market for new business, specifications for material under contract are coming in at a record-breaking pace. While mill prices remain nominal at 1.70c. to 1.80c., Pittsburgh, this does not accurately reflect the market, as 2c. could be easily obtained if the mills were in position to accept any more business. Users are offering tonnage without reference to price to be charged, but very little tonnage is available under seven to eight months delivery. Some of the business that has found its way on the books of the mills, while not entered as third-quarter business, will extend into a nine-month delivery period, owing to the congested condition of the mills. Warehouse prices in the Buffalo district have advanced 10c. per 100 lb., making steel bars and small shapes, except rounds and squares 2 in. and over, structural shapes and plates 2.45c., base. Rounds and squares, 2 in. and over, continue at 3.15c. Hoops have also advanced to 3c., base. For store-door delivery 5c. per 100 lb. is added. The Lackawanna Steel Company has taken 500 tons of reinforcing bars and 950 tons of steel sheet piling for the Buffalo General Electric power plant; the Buffalo Structural Steel Company, 125 tons for a new

building for the Castner Electrolytic Alkali Company, Niagara Falls; the Ferguson Steel & Iron Company, 150 tons for a plant addition for the International Acheson Graphite Company, Niagara Falls, and 100 tons for a leach house for the American Extract Company, Port Allegany, N. Y. The American Radiator Company is taking bids for 100 tons for a building at its Pierce plant, Buffalo.

Old Material.—The scrap market continues very active, with heavy melting steel the leader, as it was a week ago. Wrought scrap has come into the trading, having joined the movement of heavy melting steel. Buying of wrought scrap aggregated fully 15,000 tons. The price has advanced $1 per ton, and practically all that is available has been taken up. There is a good demand for railroad malleable which has also advanced 50c. per ton. Similar advances are noted in cast borings and old iron rails. There is every evidence that the prices quoted below will continue without a break for some little time. The further advance in pig-iron prices is having its influence in stiffening the scrap market schedules. We quote dealers' asking prices, per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel	$15.50 to $16.00
Low phosphorus steel	19.50 to 20.00
No. 1 railroad wrought scrap	15.50 to 16.00
No. 1 railroad and machinery cast scrap	14.25 to 14.75
Old steel axles	21.00 to 21.50
Old iron axles	21.00 to 21.50
Old carwheels	14.50 to 15.00
Railroad malleable	15.00 to 15.50
Machine shop turnings	7.00 to 7.50
Heavy axle turnings	11.50 to 12.00
Clean cast borings	9.00 to 9.50
Old iron rails	16.50 to 17.00
Locomotive grate bars	10.50 to 11.00
Stove plate (net ton)	9.50 to 10.00
Wrought pipe	12.50 to 13.00
Bundled sheet scrap	11.00 to 11.50
No. 1 busheling scrap	13.00 to 13.50
No. 2 busheling scrap	10.50 to 11.00
Bundled tin scrap	12.00

Birmingham

BIRMINGHAM, ALA., Dec. 13, 1915.

Pig Iron.—Purchases of pig iron at $14.50 in the second week of December were so liberal that the Republic and Sloss-Sheffield companies advanced their price on Dec. 10 to $15. Two sales, one of 200 and another of 300 tons, were made at $15. An offer of $14 for 1000 tons of No. 3 and of $14.50 for 500 tons of No. 2 was turned down upon the advance to $15. A sale of about 1000 tons of high silicon iron was made by the Alabama company at $17, which is $1 higher than any price previously received. As a counterpart to these higher prices, the leading interest again reports a "very satisfactory business booked at $14, $14.25 and $14.50 according to the desirability of the contract, etc." This company gives no indication of future intent, nor does it name quotations other than as expressed in the general statement as to recent sales. The Alabama company sold its regular run of foundry iron at $14 to $14.50. The Woodward Iron Company is on a $14.50 basis and only taking care of regular customers for the most part. Higher prices are demanded with the more readiness on account of the great quantity of iron that has been booked for future delivery, the equivalent of half of the make for the first half of the year being probably not a high estimate. Altogether $14 iron is very scarce, $14.50 is not obtainable in some quarters and a $15 level appears to be imminent. Birmingham operators look to the scarcity of Lake Superior ore to add to the call for Birmingham iron soon in the Chicago district. Chattanooga district foundries are reported as working on full time. The foundry melt in the South is generally improving. We quote, per gross ton, f.o.b. Birmingham district furnaces, as follows:

No. 1 foundry and soft	$14.50 to $15.00
No. 2 foundry and soft	14.00 to 14.50
No. 3 foundry	13.50 to 14.00
No. 4 foundry	13.25 to 13.75
Gray forge	13.00 to 13.50
Basic	14.00 to 14.50
Charcoal	22.50 to 23.00

Cast-Iron Pipe.—Manufacturers report considerable soil pipe business offered from Latin-America, but difficulty in securing freight rates and bottoms. One or two large orders were secured during the week by the water pipe makers. Prices are firm at the quoted figures. Stocks move as soon as manufactured. We quote, per net ton, f.o.b. pipe shop yards, as follows: 4-in., $23.50; 6-in. and upward, $21.50, with $1 added for gas pipe.

Coal and Coke.—Coke increases in demand. All beehive coke is taken care of as soon as manufactured. The movement to the Southwest is quite active and home consumption has also increased. We quote, per net ton, f.o.b. oven, as follows: Beehive furnace, $2.75 to $3; foundry, $3.25 to $3.50, with some makes bringing $3.75; by-product, 25c. under beehive. Coal improves slowly.

Old Material.—All scrap offered is taken by consumers. Dealers find it difficult to accumulate material used in steel works. Stocks generally are very low. We quote, per gross ton, f.o.b. dealers' yards, as follows:

Old iron axles	$14.50 to $15.00
Old steel axles	14.00 to 14.50
Old iron rails	13.50 to 14.00
No. 1 railroad wrought	10.50 to 11.00
No. 2 railroad wrought	9.50 to 10.00
No. 1 country wrought	9.00 to 9.50
No. 1 machinery cast	10.00 to 10.50
No. 1 steel scrap	10.00 to 10.50
Tram carwheels	10.00 to 10.50
Stove plate	8.00 to 8.50

Cincinnati

CINCINNATI, OHIO, Dec. 15, 1915.—*(By Wire.)*

Pig Iron.—Most of the inquiries reported last week have developed into sales. Michigan melters bought for first half shipment several round tonnages, included in which were 5000 tons of Northern foundry iron, 150 tons of Southern foundry and approximately 5000 tons of Northern malleable. An Ohio consumer took 300 tons of malleable. A sale of 1500 tons of Southern foundry was made in Indiana and there was the usual run of smaller orders from customers who had not fully covered for the first half. Some of this iron is understood to be for use in the third quarter. Business in this immediate territory is light, as most melters have provided for nearby requirements, but an exception may be noted in the interest taken by a local consumer in asking for quotations on a round lot of foundry iron, the order for which is expected to be closed this week. Two inquiries for malleable have come from the St. Louis district aggregating 5000 tons, part of which is wanted for the second and third quarters of next year. Comparatively few general inquiries are out for foundry iron, the majority of prospective customers preferring to sound the market through individual iron merchants. An occasional inquiry is received for last half shipment, but the furnaces are not now willing to quote except at a prohibitive advance over present prices. Southern iron is considerably stronger and neither furnace nor resale No. 2 foundry can now be obtained below $14, Birmingham basis. The majority of the Southern furnaces are holding firm at $14.50 and two producing interests have advanced to $15 for either prompt or first half shipment. Northern foundry, malleable and basic are firm at $17.50, Ironton, with little basic to be obtained for nearby shipment. The silvery irons are strong but unchanged. Based on frieght rates of $2.90 from Birmingham and $1.26 from Ironton, we quote, f.o.b., Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft	$17.40 to $17.90
Southern coke, No. 2 f'dry and 2 soft	16.90 to 17.40
Southern coke, No. 3 foundry	16.40 to 16.90
Southern No. 4 foundry	15.90 to 16.40
Southern gray forge	15.40 to 15.90
Ohio silvery, 8 per cent silicon	26.26 to 26.76
Southern Ohio coke, No. 1	19.76 to 20.26
Southern Ohio coke, No. 2	18.76 to 19.26
Southern Ohio coke, No. 3	18.26 to 18.76
Southern Ohio malleable Bessemer	18.26 to 18.51
Basic, Northern	18.26 to 18.51
Lake Superior charcoal	20.20 to 21.20
Standard Southern carwheel	24.40 to 24.90

(By Mail)

Coke.—Wise County, New River and Pocahontas foundry coke sells on about the same level, with quotations from $3 to $3.50 per net ton at oven. It is quite probable that the bulk of late business has been secured around $3.15 to $3.25. Late reports from the

Connellsville district indicate that producers are advancing prices, so that $3.25 to $3.75 at oven for foundry coke are now the ruling quotations. Furnace coke is unchanged, being quoted from $2.15 to $2.50, although some yearly contracts might be made below the maximum named. There is not much business reported in either foundry or furnace coke.

Finished Material.—The situation as to prompt deliveries is expected to become acute on both black and galvanized sheets, as well as on the larger sizes of steel bars. The mills are not anxious to take on business except from old customers, and it is all that some of them can do to make shipments on time on old contracts. This applies especially to bars and structural shapes. The mill price of No. 28 black sheets is 2.65c., Cincinnati and Newport, Ky., and No. 28 galvanized 5.15c. The local warehouse quotation on No. 28 galvanized is 4.75c. and No. 10 blue annealed 2.60c., although only a small stock of galvanized sheets can be obtained at the figure named. We quote steel bars from jobbers' stocks at 2.35c. and structural shapes at 2.45c. The jobbers are looking forward to a breathing spell during the holiday season in which period they hope to be able to finish inventories. Wire nails can be obtained from jobbers to-day at $2.10 base per keg, Cincinnati.

Old Material.—Advances have been made on quite a number of grades, chief among which are heavy melting steel scrap and the different grades of wrought scrap. It is reported that yard stocks are diminishing. The minimum figures given below represent what dealers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations are dealers' prices f.o.b. at yards:

Per Gross Ton

Bundled sheet scrap	$10.50 to $11.00
Old iron rails	14.75 to 15.25
Relaying rails, 50 lb. and up	21.25 to 21.75
Rerolling steel rails	14.00 to 14.50
Heavy melting steel scrap	13.50 to 14.00
Steel rails for melting	12.75 to 13.75

Per Net Ton

No. 1 railroad wrought	$12.25 to $12.75
Cast borings	7.50 to 8.00
Steel turnings	7.25 to 7.75
Railroad cast scrap	11.50 to 11.75
No. 1 machinery cast scrap	13.25 to 13.75
Burnt scrap	8.75 to 9.25
Iron axles	19.00 to 19.50
Locomotive tires (smooth inside)	12.50 to 13.00
Pipes and flues	10.00 to 10.50
Malleable and steel scrap	10.50 to 11.00
Railroad tank and sheet scrap	8.50 to 9.00

St. Louis

ST. LOUIS, MO., Dec. 13, 1915.

Pig Iron.—The first half, so far as local representatives are concerned, seems to be sold up, with representatives limited to small lots on submitted propositions and all quotations held subject to confirmation at the furnace. Individual sales totaled well but were, for the most part, small. An inquiry for 3000 tons of malleable for last half is still pending, as is also that for 100 tons of ferromanganese reported last week. Specifications on contracts are beginning to pile up with a growing demand for anticipation of allotments. The quotations are very firm, with some representatives asking $15 for No. 2 Southern foundry, Birmingham.

Coke.—There are a few contracts outstanding with small foundries due for renewal with the first of the year. Prices are firmly held, with the local by-product output in control of the miscellaneous local market.

Finished Iron and Steel.—Demand continues to increase with still further extension of deliveries. In practically all material four months' delivery is about the best available. Movement of stock out of warehouse has been very active, in fact the demand has been greater than the ability of the warehouse to meet. For stock out of warehouse we quote as follows: Soft steel bars, 2.25c.; iron bars, 2.20c.; structural material, 2.35c.; tank plates, 2.35c.; No. 10 blue annealed sheets, 2.60c.; No. 28 black sheets, cold rolled, one pass, 3.00c.; No. 28 galvanized sheets, black sheet gage, 5.10c.

Old Material.—Consuming industries are taking all that they can get at the moment, while dealers are again developing a strong tendency to buy against future requirements. Relaying rails are strong, particularly in the lighter weights, while dealers are finding it difficult to meet the demand. Lists out include 2500 tons from the Great Northern and 1000 tons from the Cotton Belt. We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district, as follows:

Per Gross Ton

Old iron rails	$15.00 to $15.50
Old steel rails, rerolling	16.00 to 16.50
Old steel rails, less than 3 ft	16.00 to 16.50
Relaying rails, standard section, subject to inspection	21.00 to 23.00
Old carwheels	13.00 to 13.50
No. 1 railroad heavy melting steel scrap	15.00 to 15.50
Heavy shoveling steel	13.00 to 13.50
Frogs, switches and guards cut apart	15.00 to 15.50
Bundled sheet scrap	10.00 to 10.25

Per Net Ton

Iron angle bars	$14.50 to $15.00
Steel angle bars	13.50 to 14.00
Iron car axles	19.00 to 19.50
Steel car axles	20.50 to 21.00
Wrought arch bars and transoms	16.50 to 17.00
No. 1 railroad wrought	14.00 to 14.50
No. 2 railroad wrought	13.50 to 14.00
Railroad springs	14.00 to 14.50
Steel couplers and knuckles	14.50 to 15.00
Locomotive tires, 42 in. and over, smooth inside	14.00 to 14.50
No. 1 dealers' forge	9.75 to 10.25
Mixed borings	8.00 to 8.50
No. 1 busheling	11.75 to 12.25
No. 1 boilers, cut to sheets and rings	8.50 to 9.00
No. 1 railroad cast scrap	11.50 to 12.00
Stove plate and light cast scrap	9.25 to 9.75
Railroad malleable	12.00 to 12.50
Agricultural malleable	10.50 to 11.00
Pipes and flues	10.00 to 10.50
Railroad sheet and tank scrap	10.00 to 10.50
Railroad grate bars	9.50 to 10.00
Machine shop turnings	9.50 to 10.00

San Francisco

SAN FRANCISCO, CAL., Dec. 7, 1915.

With the year-end near at hand, new projects are being delayed, and buying by consumers has narrowed a little. Merchants also are disposed to hold off until after inventory, having specified rather heavily for December, and in many cases against January contracts. General business, however, is improving, and there is a strong feeling of optimism, though price and delivery conditions will no doubt have a retarding influence. Most large buyers have been able to contract for their normal needs for the first half, but those not thus covered find it difficult to place their orders. Plenty of desirable foreign business is offered, with decreasing inclination by the mills to accept it. Local resale prices show little change, while figures received from mills show wide divergence, according to delivery and other conditions.

Bars.—Local mills note a decrease in the number of foreign orders, but their output is still closely sold for 30 days, and on some specifications they are much further behind. Moreover, agents for outside mills are beginning to turn down Oriental inquiries, and even regular local buyers find it hard to place orders for anything like reasonable delivery. Current needs in nearby territory are very light, but merchants have been specifying quite freely in preparation for a reviving spring trade.

Structural Material.—Several fabricating contracts have been closed, and a number of new inquiries are out, although the scarcity and high price of plain shapes are beginning to retard business somewhat. Last month's building reports from most Pacific Coast cities are encouraging. The Central Iron Works has a small job on an addition to the American Theater and the Pacific Rolling Mill Company is low bidder on an extension of the University of California library. The Judson Mfg. Company has the contract for an addition to the Columbia Steel Company's plant, Pittsburg, Cal. The Mortenson Construction Company has about 100 tons for the Keil Theater, this city. The Sacramento Hall of Justice, now figuring, will take about 300 tons, and bids will be opened Dec. 17 for a bascule bridge near Petaluma, Cal., requiring 280 tons. The city of Los Angeles is also taking bids for about 1000 tons of electric transmission towers. The stock of shapes on hand is light, and on new orders it is hard to get better than June delivery.

Plates.—The larger consumers, including shipbuilders and tank manufacturers, are fairly well provided for, some of them having placed long-term contracts at much lower prices than now prevail. There is no great amount of new tank work coming out, though some large construction is still under way. Shipbuilding operations are increasing, three new contracts for large oil tank steamers having been placed with the Union Iron Works, while a substantial tonnage is required for new work and repairs on Puget Sound. Jobbing trade with the small shops is fair for this time of year. Some mills are still able to give fair delivery, but are holding for stiff prices.

Sheets.—Current requirements in all lines are limited, and while a much stronger demand for galvanized and blue annealed is expected in the spring, merchants hesitate to accumulate much stock at the present prices. There has been about as much business, however, as any of the mill agents care to accept, and it is hard to place any new business in galvanized.

Wrought Pipe.—Boiler tubes are still in urgent demand, with present supplies light and deliveries very slow. Otherwise little change is apparent, though a stiffening of oil prices and improvement in building offer more encouragement for the future in both large and small sizes. Distributive business is picking up a little, but with deliveries fairly prompt the trade is delaying purchases until after the first of the year.

Cast-Iron Pipe.—No municipal orders of importance have been placed lately, but many projects are under way which should be in the market early next year. Corporation buying has been fairly active, and a number of orders have lately been received from the Hawaiian and Philippine islands. Prices remain at $33 per net ton for 6-in. and over; $35 for 4-in., and $1 extra for class A and gas pipe.

Pig Iron.—Little change is noted in the local situation. Supplies on hand are light and steadily decreasing, and business in Eastern iron is fairly active, both for early and extended delivery. Many of the local foundries are working only in a limited way, but some of the larger plants all along the coast, and a number in the interior, are quite busy. Prices show some variation, Southern iron selling at $24.50 to $26 for No. 1 foundry per gross ton, San Francisco.

Coke.—Spot offerings of foreign coke are getting down to narrow limits, and there is not much offered to arrive. Consequently there is a very fair demand for domestic coke, and contracting by foundries for deliveries through the first half has been quite general. Eastern brands are firmer, though there has not been much sold as yet above $15 per net ton.

Old Material.—Current requirements of steel melting scrap are very heavy, and dealers are firm in their views as to prices. Melters, however, have had buyers out and are finding liberal supplies scattered through the country, which are available at reasonable prices. Ordinary material moves at about $8 to $9, $12 being considered an extreme price for any kind of steel scrap. Cast-iron scrap is in fair demand, but there is no shortage, and the usual range of prices is about $14 to $15 per net ton. A lot of old material will soon be available from the Exposition, but much of this, consisting of bolts, bars and partially fabricated shapes, should under present market conditions be available for use in its present form.

The Morgan Engineering Company, Alliance, Ohio, has taken an order from the Imperial Steel Works of Japan for a 180-in. plate mill, tables, gears and other steel plant equipment. This order, it is understood, amounts to approximately $1,500,000. The Morgan Company recently practically closed a deal for machining a large quantity of high explosive shells, but before the contract was signed it decided not to engage in ammunition work, its action being largely due to the fact that orders for its regular line of products had in the meantime heavily increased. It has begun the erection of a plant extension 80 x 90 ft., to be used for an erection shop. This will be equipped with a 100-ton crane. The present erecting room will be used for machine shop purposes.

New York

NEW YORK, Dec. 15, 1915.

Pig Iron.—The market has been more active in the past week both in this immediate district and in New England. Prices have advanced further and offers are made subject to prompt acceptance. In the Buffalo district a considerable block of resale iron has been disposed of in the past two weeks at prices ranging from $17.50 to $18 and for the present no more of the 75,000 tons taken by a Buffalo and New York syndicate a few months ago is for sale. The Burden Iron Company, Troy, N. Y., has been an extensive buyer of gray forge iron in the past week, the total being reported at 35,000 to 40,000 tons. In this market some inquiry for pipe iron has come up following considerable purchases of Southern pipe iron for a New Jersey foundry. From a soil pipe company a 2000-ton inquiry is reported. A locomotive company has asked for 600 tons for the first quarter. This week a New Jersey buyer closed for 1500 tons, and 6000 tons is represented in inquiries received on Tuesday. In New England the largest buying was by a Connecticut foundry, the total amounting to about 7000 tons for early delivery, principally Virginia and Pennsylvania irons. At New Britain a textile machinery foundry has closed for 2000 tons and another New England purchase of 3000 tons was made on the basis of a quotation of ten days ago representing $17.50 at Pennsylvania furnace. One eastern Pennsylvania seller has withdrawn from the market for the time being. In the Lehigh Valley one interest is quoting $19 for No. 2 X for first quarter and another has named $20. Virginia irons are in scant supply and quotations are from $16.75 to $17.50 at furnace for No. 2 X. The Davies & Thomas Company, Catasauqua, Pa., has secured about 22,000 tons of the cast-iron segments for the tunnel under East River at Fourteenth Street, and the pig iron will be supplied by Lehigh Valley furnaces. We quote at tidewater as follows for early delivery: No. 1 foundry, 19.50 to $20; No. 2 X, $19 to $19.50; No. 2 plain, $18.50 to $18.75. Southern iron at tidewater, $19.50 to $19.75 for No. 1 and $19 to $19.50 for No. 2 foundry and No. 2 soft.

Ferroalloys.—Sales of 1500 tons of ferromanganese in three lots at $100, seaboard, are reported by a New York representative of British producers. Delivery is to be made in the first quarter. Inquiries are of moderate volume and not insistent. Receipts are equal to those of recent months and may exceed those for October and November. One steamer is expected to bring 3400 tons late in the month. The current quotation is firm at $100 seaboard, and there are predictions of an early advance. The domestic alloy is quoted at not less than $110 seaboard basis. Reports of inability to secure Brazilian manganese ore are believed to be exaggerated, as it is understood that large quantities have been sold recently and only await bottoms, which will be ultimately available. The spiegeleisen market is quiet. A western Pennsylvania producer has figured on securing further capacity and increasing its spiegel output. Ferrosilicon, 50 per cent, is in very strong demand, one representative of a large producer being entirely out of the market. The last quotation was $85 to $87, Pittsburgh.

Finished Iron and Steel.—Though fabricators are in need of work and no great amount is likely to be placed in the early future, prices of plain material still show an upward tendency, due of course to the demand for steel for other purposes and in other forms. Buying at the moment is in general lines relatively light, and while conservative mills and conservative buyers are not pressing the issue respecting last-half commitments, some sales have been made for delivery as the mill can accommodate itself, with the result that such business covers deliveries which cannot take place before July 1. The lack of interest in business offered for early shipment, except for the rounds needed for shell making, which material commands a highly profitable price, makes it difficult to estimate how much is pressing for early settlement and leaves prices somewhat

nominal. Indications are that quite a little of the future selling, taking it into second half as stated, is at a basis of 1.80c., Pittsburgh. It remains that 1.70c., Pittsburgh, is still employed in estimating on large projects. Prices for prompt business depend on the urgency of the case and the size of the order, ranging from 1.80c., Pittsburgh, to 2.10c., Pittsburgh, in the case of shapes, and as high as 2.25c. in the case of plates. The largest structural award covers 2000 tons for the building to take the site of Eden Musee, West Twenty-third Street, New York, awarded to Post & McCord. The Phœnix Bridge Company is to supply the steel for the $1,500,000 Baltimore & Ohio coal-handling pier at Curtis Bay, Md.; the Virginia Bridge & Iron Works has 1300 tons for the Southern, and Milliken Brothers, Inc., it is understood, has 350 tons for the Pennsylvania. The American Bridge Company is said to have contracted to fabricate about 2000 tons in steel caissons for East River subway work, and the Jersey City water supply pipe line, involving 10,000 tons of plates, is again up for consideration, as are 1500 tons for the jail in Jersey City, new bids being advertised for Dec. 20; 800 tons for the Chamber of Commerce, Rochester, and 750 tons for the Public Service Corporation of New Jersey. Some of the new developments in railroad cars are noted elsewhere. We quote mill shipments of steel bars nominally at 1.869c., New York; plates at 1.869c. and 2.419c., New York, the former price in six or seven months and the latter in three months; structural shapes at 1.869c. to 2.25c., New York, according to size of order and urgency of shipment, and iron bars at 1.969c., New York. For warehouse buying we quote iron and steel bars and structural material at 2.40c. and steel plates at 2.50c.

Cast-Iron Pipe.—The only municipal letting announced is that of the city of Yonkers, N. Y., on which bids will be opened Dec. 20 for 425 tons of 6 and 8 in. Private buying keeps up well, large quantities being taken by some gas and water companies for spring delivery. Prices are unchanged. Carload lots of 6-in., class B and heavier, are quoted at $27 per net ton, tidewater, class A and gas pipe taking an extra of $1 per ton.

Old Material.—The market is broader and stronger. All kinds of scrap are in good demand. The West continues to draw heavy melting steel scrap from this section while the Eastern rolling mills are free buyers of wrought scrap. The situation in steel scrap is slightly complicated by the different sets of prices quoted. High prices are paid on material wanted for the Pittsburgh market and considerably lower prices are named on scrap for delivery to steel works in eastern Pennsylvania. This has necessitated a change in the table of quotations given below. Brokers are paying about as follows to local dealers and producers, per gross ton, New York:

Railroad steel scrap or equivalent	$14.50 to $15.00
Steel scrap, yard stock (E. Pa. spec.)	13.00 to 13.50
Relaying rails	21.50 to 22.00
Rerolling rails	16.00 to 16.25
Iron car axles	24.00 to 25.00
Steel car axles	26.00 to 27.00
No. 1 railroad wrought	19.00 to 19.50
Wrought-iron track scrap	15.50 to 16.00
No. 1 yard wrought, long	14.50 to 15.00
No. 1 yard wrought, short	14.25 to 14.75
Light iron	5.00 to 5.25
Cast borings	8.25 to 8.50
Wrought turnings	8.00 to 8.25
Wrought pipe	12.00 to 12.25
Old carwheels	13.25 to 13.75
Malleable cast (railroad)	12.00 to 12.50

More interest is shown in cast scrap. Inquiries are being received for good quantities. Prices are higher. Dealers' quotations to consumers of cast scrap are as follows, per gross ton, New York:

No. 1 cast (machinery)	$15.00 to $15.50
No. 2 cast (heavy)	14.00 to 14.25
Stove plate	11.00 to 11.50
Locomotive grate bars	11.00 to 11.50

The J. J. Plank Company, Appleton, Wis., brass foundry and machine shop, made a large shipment of rolls for paper mills to Japan recently and is working on other large domestic and foreign orders on specialized equipment.

British Market Very Strong

Maximum Pig-Iron Prices Proposed—Acid Shortage Is Acute

(*By Cable*)

LONDON, ENGLAND, Dec. 15, 1915.

The pig-iron market is strong with restricted production and withdrawals continuing from public stores. Proposals are being discussed to fix maximum prices as follows: Cleveland foundry iron, 67s.; east coast hematite, 130s., and west coast hematite, 137s. Midland iron workers' wages have been advanced 10 per cent. There is good export inquiry, but trade generally is very narrow. Cleveland shipments of iron in November were 48,000 tons, of which 32,000 tons went to France and Italy. Furnaces in blast are 163 as compared with the same number a year ago. Stocks of pig iron in Connal's stores were 122,633 tons at the close of last week as compared with 124,340 tons a week ago and 126,530 tons two weeks previous.

Small quantities of 4-in. American billets have been sold at $52, c.i.f. Glasgow, for January shipment. Odd lots of American semi-finished steel have also been offered, but for shipment during the middle of 1916; but consumers are unwilling to purchase so far ahead. A shortage of acid is affecting markets and probably curtailing tin-plate output. Tin plates are firm, but many works are unwilling to quote; 25s. has been paid and up to 26s. is quoted. Makers are having difficulty in securing steel. We quote as follows, with finished steel mostly nominal:

Tin plates, coke, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 24s. upward for forward shipment, against 21s. 9d. to 22s. two weeks ago.

Cleveland pig-iron warrants, 75s. 4½d., against 72s. 2d. two weeks ago.

No. 3 Cleveland pig iron, maker's price, f.o.b. Middlesbrough, 75s. 6d., compared with 72s. 6d. two weeks ago.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £17 nominal, against £15 10s., nominal two weeks ago.

Steel ship plates, Scotch, delivered local yards, £11 5s.

Steel rails, export, f.o.b. works port, £11 5s., against £10 10s. two weeks ago.

Hematite pig iron, f.o.b. Tees, 130s. to 135s.

Sheet bars (Welsh), delivered at works in Swansea Valley, £11 paid for limited quantities, against £9 10s. two weeks ago.

Steel joists, 15 in., export, f.o.b. Hull or Grimsby, nominal and unquotable, against £12 5s. two weeks ago.

Steel bars, export, f.o.b. Clyde, £15 5s., compared with £14 10s., nominal, two weeks ago.

Ferromanganese, f.o.b., £20 15s.

Ferrosilicon, 50 per cent, c.i.f., £27.

Pig Iron and Steel Very Firm—A Shortage of Acid May Close Some Plants

(*By Mail*)

LONDON, ENGLAND, Nov. 30, 1915.—Firmness is unwavering in the pig-iron markets, the recent hesitation having given place to a wave of confidence, backed by steady buying by consumers and speculators, with no pressure by the makers to sell, as they have but little iron to spare for early delivery. Generally furnacemen are now sold up well into the second quarter and are indisposed to book new business except for far forward delivery and at their own prices. Iron shipments from the Tees continue to be hampered by the lack of tonnage, but the whole output is going into consumption.

The strength in hematite iron remains unimpaired. Practically nothing is being done for early delivery because makers have nothing to sell, while for forward there is a steady and insistent demand both for the home trade and abroad, but makers have very little to sell and domestic needs come first. The ore position is very firm, based upon freights, while there is growing tightness in coke, though this may be abated later on.

Finished steel is strong, with a general expectation that prices of Staffordshire best bars will be further raised. Marked bars now stand at £12 10s a ton, which

is far too low in comparison with common descriptions, which are worth £12 5s at least. An upward movement is expected soon, but works are generally indisposed to quote. Semi-finished steel has never been stronger. Works have nothing to sell and fancy prices have been paid where odd lots become available for early delivery. Last week £12 was paid for 200 tons of 4-in. billets and £12 15s is now asked by the same sellers. Business in Welsh bars has been done at £10 a ton, delivered locally, while works will not sell outside of the local district. The minimum price has officially been fixed at £9 10s, but it is doubtful if any material could be picked up at this figure.

SERIOUS SHORTAGE OF ACID

The position of the tin-plate and galvanized sheet works is extremely difficult, because they are not able to cover themselves in steel and are also greatly embarrassed regarding their supplies of acid. The government is looking closely into the latter question, but unless a satisfactory solution is found iron and steel works compelled to use acid will have to close. The authorities want to take the whole of the men for the army; they want the makers of acid to work night and day and make record outputs, and they say they want consumers of acid for industrial purposes to do the same thing so that exports can be kept up. It is doubtful whether any single official in this country is alive to the fact that if all the men are taken for the army industry must go short.

Quotation of prices for finished steel is mere vexation of the spirit, for practically everything is nominal, and any prices which are cabled must be regarded as only the broadest indication. If definite business were at stake it might be necessary to pay greatly higher prices, for makers will not quote now unless against definite specifications.

Metal Market

NEW YORK, Dec. 15, 1915.

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York			Lead		Spelter	
Dec.	Lake	Electrolytic	Tin, New York	New York	St. Louis	New York	St. Louis
8	19.87½	19.50	37.25	5.25	5.12½	15.00	14.75
9	19.75	19.50	37.25	5.25	5.12½	15.00	14.75
10	19.75	19.50	38.00	5.25	5.10	15.50	15.25
11	19.75	19.50	....	5.25	5.10	15.50	15.25
13	19.75	19.50	37.75	5.25	5.10	16.00	15.75
14	19.75	19.50	37.65	5.40	5.25	16.75	16.50

Copper has continued dull and is lower. Tin is stronger but the market has been quiet except for occasional buying of futures. Lead has been dull and the trade is puzzled over an advance of $3 per ton made yesterday by the leading interest. Spelter is more active and has advanced. Antimony is easier as a result of better arrivals and larger ones in prospect.

New York

Copper.—The market has been continuously dull, the only exception being the taking of small lots of resale electrolytic for which second hands have accepted 19.50c., cash, New York, and, if reports can be believed, as low as 19.37½c. The producers continue to ask 19.75c. to 20c., 30 days, delivered. Lake is nominal at 19.75c. Cable advices received to-day from London indicate that the market is stronger there, a tendency which will be reflected here. The exports this month are proceeding at a better rate than has prevailed in recent months, the total for fourteen days of December being 19,061 tons.

Tin.—Except on Wednesday and Monday last, the market has been exceedingly dull. On each of those days a business of about 250 tons was done in futures, no interest being shown in spot. It is believed that the activity of Monday would have continued into Tuesday had it not been for the storm which prevented communication with buyers in the interior. The positions to which interest has been confined are January, February and March, and the selling was restricted to one or two houses only. The arrivals this month total 3035 tons and there is afloat 5533 tons. Despite the dullness the spot quotation is stronger at 37.65c.

Lead.—Again, in the face of a market growing weaker from lack of demand, at least from domestic consumers, the American Smelting & Refining Company astonished the trade by advancing its quotation $3 per ton, or from 5.25c., New York, to 5.40c. The St. Louis price, which in the week went as low as 5.10c., is now 5.25c. The only explanation given for the unexpected advance is that there has been some quiet export buying of large proportions. There is no question that the market was dull, or that while the producers were holding fairly well to 5.25c., New York, second hands were shading prices. The London market was dull also, though to-day it went up £1, which may cause a further advance here. The exports this month total 2363 tons.

Spelter.—Since Monday some large inquiries have come before the trade and quotations have advanced rather sharply. Yesterday prime Western was quoted at 16.75c., New York, and 16.50c., St. Louis, and it was said that 17c., St. Louis, had been paid. First quarter quotations ranged from 15.50c. to 16c., St. Louis. For the second quarter 13.25c. to 13.50c., St. Louis, was quoted. Buyers have been fairly active, especially the galvanizers who started to buy when the price was about 15c. For some time it has been their custom to purchase when the market fell off, and their renewed activity has invariably started quotations upward again. The galvanizing trade is only operating about 50 per cent. Brass mill spelter has been quiet at about 18c., New York. The London market for prime Western is stronger. It advanced £4 yesterday. The exports this month total 3581 tons.

Antimony.—Recent arrivals of antimony, with prospects of larger ones in the near future, have caused the market to become easier, and Chinese and Japanese grades are quoted at 39c. to 39.50c. Business has been quiet.

Old Metals.—The market is fairly steady. Dealers' selling prices are as follows:

	Cents per lb.
Copper, heavy and crucible	18.00 to 18.50
Copper, heavy and wire	17.75 to 18.00
Copper, light and bottoms	16.00 to 16.50
Brass, heavy	12.50 to 13.00
Brass, light	11.00 to 11.50
Heavy machine composition	15.00 to 15.25
No. 1 yellow rod brass turnings	13.00 to 13.50
No. 1 red brass or composition turnings	13.00 to 14.00
Lead, heavy	4.75
Lead, tea	4.50
Zinc	11.00 to 12.00

Chicago

DEC. 13.—With a more active inquiry and more pronounced scarcity of spelter, the decline in prices appears to have been arrested. There has been little activity in copper, tin and lead, with prices moderately firm though somewhat lower than a week ago. Scrap metal prices are generally lower. We quote: Casting copper, 19c.; Lake copper, 19.75c.; tin, carloads, 38c.; small lots, 40c.; lead, 5.17½c.; spelter, nominally, 16c.; sheet zinc, nominally, 22c.; Cookson's antimony, 50c.; other grades, 42c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 15.75c.; copper bottoms, 14.75c.; copper clips, 15c.; red brass, 13.25c.; yellow brass, 11.25c.; lead pipe, 4.50c.; zinc, 13.75c.; pewter, No. 1, 24c.; tinfoil, 29c.; block tin pipe, 31c.

St. Louis

DEC. 13.—Spelter has fallen sharply with the close to-day at 16.50c. and rather weak. Lead is firm at 5.40c.; tin, 41c.; Lake copper, 20.50c.; electrolytic copper, 20c.; Asiatic antimony, 43c. In the Joplin ore market, in sympathy with the fall in spelter, ore dropped $15 per ton on the choicer grades. The range for zinc blende was $65 to $90, but buyers were not successful in getting much ore as low as $65. The corresponding week in 1914 the basis range was $45 to $47.50 for the choicer grades of blende, and spelter was 5.05c. Calamine was in light demand at $60 to $70, the bulk of the ore bringing the lower figure. The price the corresponding week of 1914 was $21 to $23. Lead ore sold at $70 to $72, compared with $47 a year ago. The average values per ton for the week's ship-

ents were: Zinc blende, $77.70; calamine, $63; lead, 7.64. Miscellaneous scrap metals are quoted as fol-ws: Light brass, 7.50c.; heavy yellow brass, 9.50c.; avy red, brass and light copper, 11c.; heavy copper d copper wire, 13c.; zinc, 7.50c.; lead, 4c.; tea lead, 50c.; pewter, 21c.; tinfoil, 30c.

Iron and Industrial Stocks

NEW YORK, Dec. 15, 1915.

The stock market has shown considerably less activity. Prices have not changed much in the course of the week, as unfavorable influences have not been sufficiently strong to depress values seriously, while favorable conditions have failed to cause prices to advance. The market appears to be waiting to learn the trend of Congressional policies. Unfavorable developments of the week were the note of the United States Government to Austria, demanding a disavowal of the sinking of the Ancona, and considerable selling of American securities on European account. Favorable news was the grant of the Interstate Commerce Commission of higher passenger rates to Western railroads and higher rates on food products to railroads in Eastern territory. The splendid showing of increased steel orders by the United States Steel Corporation had practically no influence marketwise. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chal., com..	30⅞	- 33¼	
Allis-Chal., pref..	80⅝	- 83	
Am. Can, com...	59¼	- 61¾	
Am. Can. pref...	111½	-112⅞	
Am. Car & Fdry., com.	78¼	- 82⅝	
Am. Car & Fdry., pref.		.116	
Am. Loco., com..	68	- 70¾	
Am. Loco., pref..	101¾	-102½	
Am. Steel Fdries.	60⅜	- 63⅞	
Bald. Loco., com.	111	-117¼	
Bald. Loco., pref.	108	-112	
Beth. Steel, com.	450	-485	
Beth. Steel, pref.	150	-160	
Case (J. I.), pref.....		89½	
Colorado Fuel...	49⅜	- 53⅛	
Crucible & Co., pref.....		96⅛	
Gen. Electric....	174¼	-177¾	
Int. No. Ore Cert.	47⅝	- 49¾	
Int. Harv. of N. J., com.	110	-112½	
Int. Harv. of N. J., pref.		.118½	
Int. Harv. Corp., com.	81	- 85	
Int. Harv. Corp., pref.		.108	
Lackawanna Stl.	81	- 84¼	
N. Y. Air Brake.	134	-138	
Nat. En. & Stm., com.	29	- 30¾	
Nat. En. & Stm., pref.	95	- 97	
Otis Steel, pref.	98½	-102	
Pressed Stl., com.	63	- 65⅝	
Pressed Stl., pref.	103½	-105	
Ry. Steel Spring, com.	43⅝	- 45	
Ry. Steel Spring, pref.		.100	
Republic, com...	53	- 57¼	
Republic, pref...	110	-112⅝	
Sloss, com.....	61⅛	- 66¼	
Sloss, pref.....	99	-101	
Pipe, com.....	25	- 25⅜	
Pipe, pref.....		51	
U. S. Steel, com..	85¼	- 87⅝	
U. S. Steel, pref.	115⅞	-116½	
Va. I. C. & Coke.	62	- 62¼	
West. Electric...	66¾	- 69½	
Am. Rad., com..	375	-385	
Am. Rad., pref..	135	-135½	
Am. Ship, com...	37	- 37½	
Am. Ship, pref..	82½	- 82¾	
Chic. Pneu. Tool.	78	- 79⅞	
Cambria Steel.	73½	- 77⅜	
Lake Sup. Corp..	9	- 9⅝	
Pa. Steel, com.....		62	
Pa. Steel, pref...	80½	- 82	
Warwick	10¼	- 10½	
Cruc. Steel, com..	70¾	- 74½	
Cruc. Steel, pref.	110	-111⅝	
Harb.-Walk., Refrac., com.		70	
Harb.-Walk., Refrac., pref.	99	- 99¼	
La Belle Iron, com.	50¼	- 53	
Am. Brit. Mfg., pref....		78	
Can. Car & Fdy., com.	92	- 99	
Can. Car & Fdy., pref.	105	-112	
Carbon Stl., com.	65	- 80	
Driggs-Seabury .	165	-175	
Midvale Steel....	69⅝	- 75¼	

Dividends

The American Locomotive Company, regular quarterly, 1¾ per cent on the preferred stock, payable Jan. 21.

The Electric Boat Company, extra, 15 per cent on both common and preferred stocks, payable Dec. 31, and quarterly, $4, on stock of the Submarine Boat Corporation, payable Jan. 15.

The United Shoe Machinery Company, regular quarterly, 2 per cent on the common and 1½ per cent on the preferred stock, payable Jan. 5.

The Hendee Mfg. Company, regular quarterly, 1¾ per cent on the preferred stock, payable Jan. 1.

The General Fireproofing Company, regular quarterly, 1¾ per cent each on the preferred and common stocks, payable Jan. 1.

The Ingersoll-Rand Company, extra, cash, 10 per cent on the common stock, payable Dec. 29.

The Sloss-Sheffield Steel & Iron Company, regular quarterly, 1¾ per cent, and extra, 1¾ per cent, on the preferred stock, both payable Jan. 3. The directors also decided to pay cash the 1¾ per cent scrip due Jan. 1, and the 1¾ per cent scrip due Oct. 1 next.

The Wagner Electric Mfg. Company, regular quarterly, 2 per cent, an extra cash 2 per cent and a stock dividend of 10 per cent, payable Jan. 1.

The American Iron & Steel Mfg. Company, regular quarterly, 1¾ per cent on the preferred stock, payable Jan. 1, and 1 per cent on the common stock, payable Jan. 31.

The Colts Patent Fire Arms Mfg. Company, regular quarterly, 2½ per cent, and extra 10 per cent.

The American Brake Shoe & Foundry Company, regular quarterly, 2 per cent on the preferred stock and 1¾ per cent on the common, payable Dec. 31.

The Reo Motor Car Company, regular quarterly, 2½ per cent on the common stock, payable Jan. 10.

The Whitaker-Glessner Company, quarterly, on the common stock, of 1½ per cent, payable Jan. 1. Previous dividends on this stock were at the rate of 1 per cent quarterly.

The American Laundry Machinery Company, regular quarterly, 1 per cent on the common stock, payable Dec. 10, and 1¾ per cent on the preferred stock, payable Jan. 15.

Tunnel Segment Contracts Let

The Davis & Thomas Company, Catasauqua, Pa., has received from Booth & Flinn, Ltd., general contractors for the tunnel under the East River at Fourteenth Street, New York, the contract for 22,000 tons of cast-iron segments, or about half the total, while the remainder, as in the last tunnel segment award, was divided equally between the Wheeling Mold & Foundry Company, Wheeling, W. Va., and the New York Car Wheel Company, Buffalo. The pig iron for the Catasauqua contract will be furnished by Lehigh Valley furnaces; that for the Buffalo foundry from the Buffalo district, and that for the Wheeling contract from Central Western furnaces.

New Chain Prices

Prices on chain, f.o.b., Pittsburgh, are now as follows, per 100 lb., on straight link proof coil, self-colored or blacked: 3/16 in., $7.75; ¼ in., $5.20; 5/16 in., $4.20; ⅜ in., $3.65; 7/16 in., $3.50; ½ and 9/16 in., $3.35; ⅝ and 11/16 in., $3.25; ¾ and 13/16 in., $3.15; ⅞ and 15/16 in., $3.05; 1 in., $2.95; 1 1/16, 1⅛ and 1¼ in., $3.05. Extras to be added to proof coil prices, per 100 lb.: Twist link coil, 3/16 to 7/16 in. inclusive, 25c.; bright coil, chain, 25c. B. B. quality, 3/16 and ¼ in., $1.25; 5/16 in. and larger, $1. B. B. B. quality, 3/16 and ¼ in., $1.50; 5/16 in. and larger, $1.50.

Furnace Coke from Peat Distillation

Coke obtained from a new process of peat distillation in England is reported to be satisfactory for metallurgical purposes. Its analysis shows: Carbon, 92 per cent; moisture, 1 per cent; volatile matter, 1.3 per cent; ash, 5.7 per cent. From a ton of peat nearly two-thirds ton of coke is obtained. The distillation process, which is patented, yields also fuel oil, toluol, ammonia, paraffin wax and acetone in paying quantities. The process has been in operation six months. A description is given in Commerce Reports for Nov. 19, 1915.

The Standard Pump & Engine Company, Cleveland, Ohio, has been consolidated with the Adamson Machine Company, Akron, Ohio. The latter will take over all the assets and assume all the accounts of the first-named company which will continue to be operated under its present name.

The Crucible Steel Company of America, Syracuse, N. Y., has let contracts for construction of an annealing building, 70 x 140 ft., brick and steel, to be erected on Emerson Avenue at a cost of $15,000. E. L. French is manager.

John Monks & Sons, 82 Beaver Street, New York, have begun the construction of a wharf for the General Chemical Company, which has moved its plant from Camden, N. J., to Marcus Hook, Pa. It will cost $200,000.

The Syracuse Malleable Iron Works, Syracuse, N. Y., has started work on an addition to its foundry, 110 x 150 ft., one story, on North Geddes Street.

The North East Electric Company, Rochester, N. Y., has let contracts for an addition, 168 x 264 ft., one story, of brick and steel, to cost $20,000.

New York Gas-Producer Plants Generally Satisfactory

About 79 per cent of the gas producer power plants installed in New York City and vicinity have been successes, according to C. M. Ripley, consulting engineer, New York City, in an address which he made recently before a New York meeting of the American Society of Mechanical Engineers. He visited gas-producer plants in New York City and then made a canvass to ascertain the opinions of owners. The investigation covered thirty-three going plants in all, two of 1000-hp. capacity and ranging from this size down to one of 30-hp. capacity.

He divided the plants into two general classes, the large plant comprising those of 250 to 1000-hp. capacity, of which there were 12, and the small plants, those ranging from 200 hp. down to 30 hp., 21 in number. The general attitude of the owners regarding the plants is indicated in the accompanying table.

Experience with Gas Producers in the New York Metropolitan District

	Large Plants		Small Plants	
	Yes	No	Yes	No
Do repairs exceed expectation?..	8	2	1	15
Does depreciation exceed expectation?	5	4	1	15
Does labor charge exceed expectation?	5	5	2	14
Would you again install gas-producer plant?	5	3	12	3

Of the large plants, the views of two were not obtained, and of the small plants five failed to respond.

The author suggests that the percentage of mortality for gas-producer plants is not low when we consider the comparatively recent development of internal combustion engines and gas producers as compared with the history of the development of steam. The mortality rate for gas-producer plants of which Mr. Ripley has a record, indicates that 17 per cent of the number of these in New York and the metropolitan district have been discontinued and one of the cases was where the company retired from business. He intimates also the possibility of a parallelism with the competition from public service electric stations, which has probably resulted in the shutdown of about 10 per cent of the independent electric plants using steam in Manhattan Island.

Only two of the thirty-three plants referred to use bituminous coal, the remainder using either pea or buckwheat anthracite. He noted that only slightly more fuel is used in the plants for 24-hr. runs than for a 12-hr. run. He finds that more or less green fuel is removed with the ash when cleaning fires, and this and other reasons were advanced for explaining the difference.

He found the considerable head room needed for gas producers even in small plants was overcome in two cases by locating the producer out of doors, thus saving excavation.

He holds that the importance of skill on the part of the engineer in charge of the gas-producer plant is often unduly underrated by the salesman of the gas-producer plant.

One conclusion to be drawn from his investigation, which is reported at length in the December *Journal* of the American Society of Mechanical Engineers, is that there is a higher degree of satisfaction realized with the smaller producers than with the larger producers.

Manganese Ore from the Caucasus

To what extent the war has affected the Caucasian manganese ore industry is shown by authentic data just published. The production of Caucasian manganese ore in 1914 was 652,355 tons against 953,645 tons in 1913, the record year. Ore put on the market in 1914 was 704,080 tons against 1,061,726 tons in 1913, rail consignments from the mines in each case being but little less than these amounts. Of the 1914 sales 98 per cent, or 688,984 tons, was exported and 2 per cent or 15,096 tons consumed at home. Exports in 1914 were as follows: Germany, 326,403 tons; Belgium, 154,467 tons; United Kingdom, 107,630 ton United States, 34,548 tons; Austria-Hungary, 32,4 tons, and France, 23,951 tons, almost entirely in t first seven months of the year. Exports to Germa in 1913 were over 400,000 tons and to the United Stat over 135,000 tons. The large tonnage absorbed Germany is interesting, as that country is entire dependent on other countries for its high-grade ma ganese ore.

Landers, Frary & Clark Pension Plan

The directors of Landers, Frary & Clark, Ne Britain, Conn., have voted to establish a pension pl to become operative Jan. 1. The plan as announced i

Male employees who have been with the company 25 yea or over will be retired at the age of 70. Female employe in service a similar length of time, will be retired at the a of 60.

A pension board of three members will have charge of t administration of the pension system. The president of t company shall be the head of this board and its membe shall be appointed annually by the directors or preside

To be eligible for pension, employees must become me bers of the Landers, Frary & Clark Mutual Aid Association March 1, 1916, and remain a member in good standing. pension shall become operative until after the payment of sick benefits the pensioner may be entitled to receive sh have ceased.

Each male employee as specified above shall be retired the age of 70 and receive pension unless at his request a with the approval of the pension board some later date f retirement is fixed. Female employees shall be retired in t same manner at the age of 60. Employees who have been or more years in the service and have become permanently capacitated for further work may at the discretion of t pension board receive a pension. Any male employee from to 69 years of age and 25 years or more in the service of t company who has become incapacitated for work may ma application or be recommended for retirement and the pe sion board shall decide on his case. The same applies to a female employee from 55 to 59.

The amount of pension shall equal 1 per cent. of t average yearly wage for ten years prior to retirement tim the number of years employed, but such pension shall not less than $250 nor more than $1,000 per year. Payments to be made the first of each month.

The pension board may at its discretion direct allowan be continued to widow or children of the pensioner. No pe sion shall be pledged or transferred without consent of t board. Pensions may be suspended or terminated for m conduct. Pensioners may engage in other employments pr vided they are not of a competitive nature.

Mitigation of Electrolysis

Electrolysis mitigation through protecting und ground structures is discussed in Technological Pap No. 52 issued by the U. S. Bureau of Standar Methods of mitigation are discussed under two heads those applicable to pipes and those applicable to t railroad return systems. The conclusion is drawn th while certain of the methods applicable to pipes, pa ticularly pipe drainage and insulating joints, are oft valuable, they should in general be used as auxilia measures only, the chief reliance being placed on r ducing potential drops in the railroad return to re sonably low values. When return feeders are nec sary for accomplishing this, insulated feeders are pr erable because more economical.

New Manganese Ore Mine in Germany

The *Zeitschrift des Vereins Deutscher Ingeni* states that, since Germany has an extraordinary ne for manganese ore which in times of peace is obtain from Russia and India—quantities to the value of 1 400,000 marks coming from Russia in 1913 and 8,8 000 marks worth from India in that year—war con tions have caused extensive explorations for Germ ore. According to the *Frankfurter Zeitung* success borings on the Prussian-Hessian frontier near the v lage of Lützellinden have revealed a considera deposit.

NEW TRADE PUBLICATIONS

Force Feed Lubricator and Sight Feed Oil Pump.—Richardson-Phenix Company, Milwaukee, Wis. Two bulletins. The first, No. 50, contains a complete description of the Phenix ratchet type lubricator for one or two feeds and a new type designed for from two to seventy-two feeds. A diagram giving a comparison of the way in which mechanical and hydrostatic lubricators feed oil to engine cylinders is presented together with numerous illustrations showing the application of lubricators to different types of engines, pumps, steam hammers, etc. The other bulletin, No. 60, shows the steps in the process of manufacture of a sight feed oil pump lubricator. The question of gas engine lubrication is discussed at some length and mention is made of the air spray and oil heating attachments.

Lathes.—Porter-Cable Machine Company, Syracuse, N. Y. Circular. Describes a manufacturing lathe especially designed for the economical production of duplicate parts in large quantities. The text is supplemented by several engravings and mention is made of the various extra equipment that can be supplied for the lathe and the facing attachment as illustrated. Specifications of two sizes of the machine are included.

Portable Air Compressors.—Zin-Ho Mfg. Company, 1212 Michigan Avenue, Chicago, Ill. Bulletin No. B5. Covers a line of portable and semi-portable air compressors which were illustrated in THE IRON AGE, Nov. 4, 1915. After a brief description of the various features of the construction, views of the different styles are given with dimension and specification tables. Mention is also made of lighting and power plants and a pumping outfit using internal combustion engines.

Metal Shingles.—Globe Iron Roofing & Corrugating Company, Cincinnati, Ohio. Booklet. Relates to a line of metal shingles that are made in a variety of designs with either painted or galvanized finish. The uses of these shingles and their advantages are briefly touched upon, followed by illustrations of the different types, both singly and in groups, and accessories such as shingle valleys, gable end and corner finishes, ridge roll, porch flashing, etc. Instructions for applying the products are included.

Electric Motors.—Holtzer-Cabot Electric Company, Boston, Mass. Form No. 1408. Illustrates a number of different types of electric motors and generators for both direct and alternating current. Each page contains an illustration of some particular machine with a list of the sizes in which it can be supplied and a reference to the bulletin where a complete description can be found.

Portable Electric Grinding Machines.—Standard Electric Tool Company, Cincinnati, Ohio. Bulletin G-9, superseding bulletin G-8. Describes a line of electric grinding machines which includes universal aerial portable and bench types. A general description is first presented followed by illustrations with brief descriptions and specifications of the various machines.

Locking Bolt.—J. H. Burnett Iron Works, Inc., Fresno, Cal. Pamphlet. Treats of a locking device known as the Johnny Bolt, which was illustrated in THE IRON AGE, July 1, 1915. The bolt consists of three parts, the bolt proper, the nut and the locking device. A number of illustrations showing the bolt in use and the way in which the lock is applied and removed are presented.

Traction Excavator.—Keystone Driller Company, Beaver Falls, Pa. Bulletin No. 901. Deals with a light, portable general utility steam shovel which can also be employed as a dirt loader and grader and a ditch digger by rearranging the sheaves and tackling and changing the form of shovel or scoop. A general description of the excavator is presented followed by descriptions in more or less detail of the operation of the machine for the three different classes of work. Illustrations of the excavator in use and a number of testimonial letters are included.

Feed Water Meters.—Harrison Safety Boiler Works, North Philadelphia Station, Philadelphia, Pa. Pamphlet. It is a reprint of a paper entitled "Establishing and Maintaining Boiler Room Economy," which was presented before the Ohio Society of Mechanical, Electrical and Steam Engineers. The paper develops the thesis that the most important requisite to further improvement in boiler plant economy is means of determining the number of pounds of water evaporated per pound of coal, which can be secured continuously by employing a feed water meter. A heat balance chart is given and a brief illustrated description of the Cochrane metering heater is included.

Germany's Electric Steel Output Much Increased

Germany's production of electric steel during the war has made rather surprising strides, especially as compared with crucible steel. The following table, based on official German statistics, gives the output by months since the war started:

1914	Electric Steel, Metric Tons	Crucible Steel, Metric Tons
August	2,810	8,124
September	3,222	7,819
October	4,666	9,131
November	6,567	8,329
December	8,083	8,428
1915		
January	7,459	9,655
February	8,902	7,462
March	9,089	8,214
April	6,882	7,793
May	7,448	8,329
June	9,972	8,366
July	12,046	8,555
August	12,679	8,761
September	12,619	8,415
Total, 1908	19,536 (1,628)	88,183 (7,348)
Total, 1911	60,654 (5,054)	78,760 (6,563)
Total, 1913	101,755 (8,479)	99,173 (8,264)
Total, 1914	89,336 (7,445)	95,096 (7,924)

The figures in parentheses are the average per month.

From this table it may be seen that the war has had very little effect on the output of crucible steel, the average for the 14 months of the war to Oct. 1, 1915, being 8383 tons per month, which compares with the monthly average of 8264 tons for the record year, 1913.

In electric steel the average monthly output for July, August and September this year was 12,448 tons, as against only 8479 tons per month in 1913, the record year. The extent of the increase is emphasized still more when it is noted that in the first month of the war the production fell to 2810 tons. The great development in electric steel is shown by an average output in 1908 of only 1628 tons per month.

Steel-Aluminum Cables

The fact that steel-reinforced aluminum cables have been in use for more than 10 years indicates that they are now beyond the experimental stage, E. T. Driver and E. V. Paunell write in the *Electrical World*. Two important power undertakings alone employ in the aggregate 70,000,000 lb. of steel-aluminum conductors. For many years aluminum conductors for long-distance transmission have been found economical, but owing to the lower tensile strength it is impossible to pull them up as tightly as copper. The simplest form of the steel-aluminum cable is that in which six aluminum strands are laid up around a central steel wire, all of the seven strands being of the same size. Larger areas, up to about 225,000 circ. mils., usually have the single steel wire replaced by a 7-wire steel cable of the same area, the ratio of steel to aluminum being the same in both cases.

Smaller Imports of Magnesite and Chrome Ore

Imports into the United States of both magnesite and chrome iron ore in September were considerably less than in August. The following table, compiled from Government data, shows the serious effect of the war on these supplies:

	Imports of Magnesite, Gross Tons	Imports of Chrome Ore, Gross Tons
September, 1914	2,342	8,000
September, 1915	834	8,560
August, 1915	2,376	11,534
Nine months ended Sept. 30, 1913	123,660	50,779
Nine months ended Sept. 30, 1914	92,924	56,081
Nine months ended Sept. 30, 1915	20,121	38,649

This is a decrease of 78 per cent in magnesite for the nine months, comparing 1915 with 1914, and 31 per cent for chrome ore.

Japan's imports of ferromanganese in 1914 fell to a value of $65,466 as compared with $256,234 in 1913. In ferrosilicon and spiegeleisen there was an increase in 1914 to $94,992 from $84,499.

HIGH-PRICED BATTLESHIPS

Navy Yard Cost Put at $9,000,000—Estimate for Armor Plant, $11,000,000

WASHINGTON, D. C., Dec. 14, 1915.—Secretary Daniels has decided to reject all the bids of the private shipyards for the construction of battleships Nos. 43 and 44 on the ground that they exceed the Congressional appropriation and to assign the vessels for construction to the New York and Mare Island navy yards. This decision involves considerable delay, and the Secretary frankly admits that the keels of these vessels cannot be laid before August or September of next year. The New York yard alone is equipped to build a dreadnaught and is now constructing the California, which will not be launched before September, 1916. It will require an expenditure of between $300,000 and $400,000 to fit up the Mare Island yard for a 32,000-ton ship, and the task can hardly be completed under seven or eight months.

Taking Secretary Daniels' figures as a basis, with the increased cost of steel, machinery and labor, there is every reason to believe that it will cost the Government over $9,000,000 each to build these battleships, or approximately $1,000,000 more than they could have been contracted for in private yards. Even these figures take no account of the cost of equipping the navy yards to build these vessels and are predicated upon the extraordinary bookkeeping system instituted by Secretary Daniels, which limits overhead charges on the construction of a battleship to items specially incurred "instead of making it pay its proportion of overhead charges, which would have gone on if the yard had never built a ship," to quote the language of the Secretary's annual report.

The Navy Department has awarded contracts for 67,152,620 lb. or 27,600 gross tons of steel for the battleships Nos. 43 and 44 on the basis of bids opened Dec. 3. The Carnegie Steel Company is awarded 51,882,300 lb. of medium class steel plates, angles, beams, channels, etc., and special treatment steel plates; the Carbon Steel Company is awarded 8,611,720 lb. of nickel steel plates; the American Steel Foundries, 1,836,800 lb. of steel castings; the Pittsburgh Screw & Bolt Company, 3,593,800 lb. of bolts and rivets, and H. A. Wagner, 228,000 lb. of bolts and rivets. As neither the New York nor the Mare Island navy yard, where these vessels are to be built, will be ready for the laying of their keels before September, 1916, the contractors will have ample time in which to manufacture the material covered by their bids.

Bids for the two fleet submarines authorized by the last naval appropriation act will be opened Feb. 16. These vessels will have a surface speed of 25 knots and a displacement of 1300 tons. The five-year building program for the Navy which has been recommended to Congress will include eighteen vessels of this type, some of which presumably will be larger. Up to the present time no European country has built a submarine approaching 25 knots surface speed, and the construction of these two boats will be more or less of an experiment. To secure the desired speed steam turbines have been designed for surface operations, but alternate bids based on oil or gas engines will be considered.

Senator Tillman, chairman of the Senate Committee on Naval Affairs, has presented a bill for a Government armor plant, the cost of which is estimated at $11,000,000. The site of the plant is to be left to the discretion of the Secretary of the Navy, but Senator Tillman expresses a preference for the vicinity of the League Island navy yard, where the Government owns a considerable tract of land. It is obvious that the enthusiasm for "preparedness" is to be utilized to the utmost to force through the Government armor factory bill and a provision in the naval appropriation bill authorizing the construction of a plant for the manufacture of projectiles of large caliber. W. L. C.

The Illinois Steel Company blew in its idle blast furnace at Milwaukee Dec. 10.

Activity in Lake Vessel Deals

The most important deal that has been made Lake vessel property, since the ore-shipping intere began to negotiate for additional vessel tonnage cause of a possible shortage in the carrying capac for ore next year, was closed a few days ago wh M. A. Hanna & Co. and the Cambria Steel Compa jointly purchased four modern steamships from Frontier Steamship Company and one from the Niag Transit Company, both of Tonawanda, N. Y. steamers acquired are the Charles Weston, D. Meacham, J. G. Munro, James Corrigan and William Rogers. These boats have a combined carrying capac of about 70,000 tons per trip. They will be opera by M. A. Hanna & Co. In addition this firm has cured control of the Charles O. Jenkins, Thom Shaughnessy and F. B. Squires of the Jenkins Stea ship Company, and a boat recently ordered by t firm and the Donner Steel Company. Between 15 a 20 bulk Lake freighters have changed hands in t past few weeks, nearly all being taken over by shipp and consuming interests. Eight bulk freighters h been ordered for delivery in 1916 and they will be op ated by shippers or managers having connections w ore firms. With a number of orders for vessels for t coast trade, Lake shipyards cannot take on any ad tional orders for boats for delivery before next f and some inquiry has come out for vessels for deliv in 1917.

Railroad Car Business

The railroad cars closed since last week's rep include 1000 hopper cars for the Erie, placed with t Pressed Steel Car Company, and 500 gondolas for t Erie placed with the American Car & Foundry Co pany; 250 car bodies for the Virginian and 750 c for the Duluth & Iron Range, in both cases pla with the Standard Steel Car Company, and 100 g dolas for the Long Island to be built by the Pres Steel Car Company. An early decision is expected 1000 underframes for the Delaware & Hudson.

Among new inquiries may be mentioned the Chic Great Western for 500 box cars, the New Haven s tem for 500 coal cars, 20 milk cars and 50 refrige tor cars; the New York, Ontario & Western for 300 400 coal cars, 100 gondola cars and 50 ballast cars, a it is rumored that the Coal & Coke Railway of W Virginia will enter the market for 1500 coal cars. T New York Central is to buy between 30 and 60 coach The Kansas City Southern inquiry for 200 gond bodies has been withdrawn and the Rutland is not buy.

Locomotive and Car Orders

Orders for over 80 locomotives have been pla since our last compilation two weeks ago. These nearly all small contracts for one to six locomoti placed by small railroads and industrial companies, cept 25 for Russia reported ordered from H. K. Por & Co., Pittsburgh, and 10 for the Erie ordered from t American Locomotive Company. It is estimated th the total for November is 370 locomotives, of wh 361 are domestic. This makes the total for the months of the year 1865 locomotives, of which 650 foreign and 1215 domestic.

Car orders for November foot up 19,863, whi with those since July 1, make 62,162 for the last h to Dec. 1. This now exceeds the total for the first h of the year, which was 61,916, bringing the orders 124,078 cars for the 11 months of this year. T contrasts with 80,000 cars ordered in 1914 and 147,0 in 1913. It is not now likely that orders for 1915 w equal those of 1913.

The Washington Manganese, Coal & Copper Co pany, which recently succeeded the Pacific Iron Steel Company, and has mines near Hoodsport and plant at Tacoma, Wash., proposes to embark in t production of ferromanganese.

Pittsburgh and Nearby Districts

The thirteenth annual report of the Harbison-Walker Refractories Company, Pittsburgh, covering the year ended Sept. 30, 1915, shows gross earnings, after deducting $286,329.57 for repairs, maintenance and depreciation of plants, of $1,673,790.38. After usual charges and dividends, a surplus was left of $562,888.61, which, added to the previous surplus, makes $6,842,653.49 Sept. 30, 1915. President H. W. Croft, in his accompanying statement, says that the increased profits of the company this year over last year were due largely to the rapid revival of the steel business in the last half of the fiscal year. The balance sheet shows no bonded indebtedness and current liabilities of only $778,511, against current assets of $1,223,225.61. There are also investment securities amounting to $1,014,851.59. The annual meeting of stockholders will be held in Pittsburgh Jan. 17, 1916.

Owing to the heavy demand for sheets, the American Sheet & Tin Plate Company will start up its plant at Hyde Park, Pa., which has been idle for several years. It contains six hot mills and makes black sheets only.

The La Belle Iron Works, Steubenville, Ohio, has sold to bankers $3,500,000 first mortgage sinking fund 5 per cent bonds, due in 1940, tax refunded in Pennsylvania. With the proceeds of these bonds the company will retire $1,580,000 6 per cent bonds outstanding, thus making the new issue a first mortgage on the entire plant. The remainder of the money realized will be used largely to pay for the 94 Koppers by-product coke ovens which the company is now building.

One of the two new open-hearth furnaces being built by the Republic Iron & Steel Company, Youngstown, Ohio, was started last week, and the other is expected to make steel the latter part of this week. These two furnaces will increase the output of open-hearth steel of the Republic company about 8000 tons per month. It now has a total of twelve open-hearth furnaces.

Reports are that the plant of the Pittsburgh Model Engine Company at Lexington Avenue on the Pennsylvania Railroad, Homewood Station, near Pittsburgh, will soon pass into the control of the Standard Steel Car Company, Pittsburgh. The deal for the purchase of the plant is expected to be completed within a week.

The H. K. Porter Company, Pittsburgh, has received an order from Russia for 20 locomotives. This company received last summer an order for 35 locomotives for Russia, making 55 in all, and they will be shipped as fast as possible.

It is stated that the H. C. Frick Coke Company has declined to purchase the coal holdings of J. V. Thompson, the bankrupt coal operator, located in Greene County, Pa. It is said the property involves nearly 6000 acres of choice coal holdings and that it was appraised some time ago at $750 per acre by Julian Kennedy, R. C. Crawford and R. M. Hite, appraisers appointed by the Fayette County Court. It is stated that the property was offered the Frick Coke Company at $400 per acre, but the company regarded the price as too high.

The Mahoning Steel Products Company has been incorporated, with a capital of $50,000, and will use the building formerly occupied by the Sykes Lathe & Roofing Company at Niles, Ohio. The new company will make steel barrels and other sheet steel specialties. The incorporators are C. C. Stuart, C. H. Lewis, I. A. Thomas and George T. and Charles Fillins.

The Standard Sanitary Mfg. Company of Pittsburgh, manufacturer of bathroom supplies, is considering the opening of a warehouse, salesrooms and agency offices in Youngstown, Ohio, but as yet no definite site has been selected.

The Oliver & Snyder Steel Company is installing two Covington coke drawing machines at its No. 2 plant at Oliver, Pa., because of its inability to secure men to operate 275 of its ovens. Each machine, it is said, will displace 15 men and is able to pull 40 ovens a day, although owing to the particular construction of this plant the number will be restricted to 32. The machines are supplied by the Covington Machine Company, Covington, Va. The Oliver Company has these machines in use at its other two plants.

William H. McKenna, president McKenna Bros. Brass Company, Pittsburgh, and also vice-president Vanadium Alloys Steel Company, Latrobe, Pa., has organized the Vasco Mining Company for the production of Feberite, a composition of iron and tungsten. This material will be made into ferrotungsten at the Latrobe plant of the Vanadium Alloys Company. When the embargo was placed on tungsten at the outbreak of the war in Europe Mr. McKenna purchased extensive mineral lands in Colorado.

Official denial is made that the Bethlehem Steel Company, South Bethlehem, Pa., is to take over the interests of the Titusville Iron Company, Titusville, Pa. The Titusville Forge Company, located at Titusville, is owned by the Bethlehem Steel Company.

The Westinghouse Electric & Mfg. Company, East Pittsburgh, is equipping a plant on Twenty-eighth Street in that city for finishing 8-in. shells and is buying lathes and other shell equipment.

The Heppenstall Forge & Knife Company, Pittsburgh, which is making large additions to its plant, has purchased two 32-ft. span, 5-ton, three motor, electric traveling cranes from the Pawling & Harnischfeger Company, Milwaukee, Wis.

Among the orders recently booked by the National Transit Pump & Machine Company, Oil City, Pa., is one for three of its new type of Diesel oil engines. These are to be installed in the Joplin zinc district and will be an innovation in prime movers in that field. The Flannery Zinc Company, Sarcoxie, Mo., will use a 200-hp. Diesel oil engine to drive its mill. Another of 150-hp. is to be directly connected to an improved type of Sullivan air compressor. A third engine and large power pump will be used in dewatering the mine and will make the first Diesel engine pumping unit to be installed in the Joplin district. The pump barrels will be 300 ft. below the surface, while engine and pump will be above ground, a new method of installation in which the National Transit Company is the pioneer.

The Keystone Brush & Paint Company, Pittsburgh, with a capital stock of $10,000, has been incorporated by W. C. Colflesh, 1016 Parker Avenue, McKeesport; H. H. Hults, Otto, Pa., and T. F. Soles, McKeesport, to manufacture paints and brushes.

The Justrite Mining Tool Company, Pittsburgh, with a capital stock of $15,000, has been incorporated by Frank K. Tavey, 7602 Kelley Street, Pittsburgh; Arthur E. Wilson, Pittsburgh, and D. Paulson Foster, 537 Washington Avenue, Carnegie, Pa., to manufacture miners' tools and other hardware.

The Donora Zinc Company, Pittsburgh, with a capital stock of $10,000, has been incorporated by R. T. Russell, 1027 Carnegie Building, Pittsburgh; C. L. Miller, E. C. McHugh, L. R. Martin and J. A. Hager, all of Pittsburgh, to manufacture zinc, lead, copper and by-products.

The recent statement in this column that Neville Island and Edith furnaces, which are scheduled to blow in, had not been operated since 1907 was in error. Both were blown in in the fall of 1909 and were operated for six months or more, Neville Island furnace going out on April 28, 1910, and Edith furnace on June 6.

Reports that the Jones & Laughlin Steel Company will build one or two more blast furnaces at Aliquippa, Pa., are officially denied. More blast furnaces will at some time be built there, but so far nothing whatever has been done in making plans for them.

The Youngstown Sheet & Tube Company, Youngstown, Ohio, has placed an order with the Pennsylvania Engineering Works, New Castle, Pa., for a 1300-gross-ton hot metal mixer to be used between its blast furnaces and open-hearth steel plant. It has also contracted with the Wheeler Condenser & Engineering

Company for three towers for cooling water at the coke plant, each tower to have a capacity of 3,000,000 gal. per 24 hr., reducing the water from 130 to 85 deg. with 80 deg. atmosphere and 70 per cent humidity.

The next monthly meeting of the Association of Iron and Steel Electrical Engineers will be held in the German Club, Pittsburgh, on Saturday, Dec. 18. Moving pictures, music and refreshments are on the program.

The annual meeting of district sales agents, about 25, of the Youngstown Sheet & Tube Company is being held at Youngstown, Ohio, this week. On Monday a trip of inspection was made through the company's plants at East Youngstown and Struthers. The following cities were represented: New York, Boston, Pittsburgh, Chicago, St. Louis, Philadelphia, Denver, San Francisco, Seattle, Atlanta, Ga., and Dallas, Tex. W. E. Manning, general sales manager of the company, had charge of the entertainment.

The Republic Iron & Steel Company, Youngstown, Ohio, has placed an order with the Morgan Construction Company, Worcester, Mass., for a 10-in. mill to be installed in the Brown-Bonnell works.

Stockholders of the Driggs-Seabury Ordnance Company, Sharon, Pa., have voted to increase the common stock from $3,000,000 to $10,000,000. Of this increase $6,000,000 will be issued soon to pay for the recent purchase of the plant of the Savage Arms Company, Utica, N. Y. It is also likely that a considerable part of the new issue will be used to make large additions and improvements at the Sharon plant.

Alice furnace, of the Valley Mold & Iron Company, at Sharpsville, Pa., whose product of basic iron, about 300 tons per day, is taken by W. P. Snyder & Co., had an accident on Monday and the furnace has been blown out. It will probably be about six weeks until repairs can be completed. This will intensify the shortage in supply of basic iron in the Pittsburgh and Valley districts. Contract for rebuilding the furnace has been placed with the William B. Pollock Company, Youngstown, Ohio, and work will be rushed.

The National Tube Company, Pittsburgh, will erect four 80-ton open-hearth furnaces and a 40-in. blooming mill at its works at Lorain, Ohio. The blooming mill will be electrically driven, a gas unit being supplied for the generator. Coal was formerly used at this plant for fuel, but the company is laying a 12-in. gas line from the Cleveland district and about Jan. 1 will use no coal. The consumption of gas is expected to be about 12,000,000 ft. per day when the plant is running full. The gas will be bought from the Kipton Oil & Gas Company. The Tube Company now has six 80-ton furnaces at Lorain and the four new furnaces will increase the output of steel about 700 tons per day. Contracts for the new furnaces and mill are expected to be placed early in January.

At the stockholders' meeting of the Youngstown Sheet & Tube Company held Tuesday, Dec. 14, the directors were authorized to build another blast furnace at Youngstown, to be of the same size and type as the present four stacks. It will be 22 x 88 ft. and will make at least 500 tons of pig iron per day. Construction will be started as soon as contracts can be placed.

November Bridge and Structural Contracts

In November 105 per cent of the capacity of the bridge and structural shops of the country was put under contract, according to the records of the Bridge Builders and Structural Society. This gives an average for the eleven months of this year of 67.6 per cent, against 52 per cent for 1913 and 52.2 per cent for 1914. The total amount of business put under contract since the outbreak of the European war is, according to the records from the same source, practically as large in amount as that taken in the sixteen months preceding the war; 56.2 per cent being the average in the one case and 56.5 per cent in the other.

Naylor & Co. have opened an office in the Real Estate Trust Building, Philadelphia, with Laird V. Park as manager. The company handles iron ore, pig iron, steel and ferroalloys.

The New England Labor Situation

The labor trouble at the Winchester Repeating Arms Company, New Haven, Conn., proved to be of short duration and the men are back, the strike having been called off by the leaders. The expected outbreak at the Union Metallic Cartridge Company, Bridgeport, Conn., has not taken place and each day's delay lessens the chance that there will be a strike. The trouble at the Knox Motors Company, Springfield, Mass., has been settled by a compromise, details of which have not been given out. The controversy arose over the method of payment for overtime work. A strike of about 125 snaggers of the Saco-Lowell Shops, Newton Upper Falls, Mass., who presented demands for an increase from 16c. per hour to 18c., has been settled on the basis of a new rate of 17½c. per hour.

Labor Commissioner Hyde of Connecticut reports that there have been 90 strikes in the State in the last few months but there is now none with any standing except that of the employees of the International Silver Company, Meriden. Rogers & Bro., Waterbury, Conn., one of the subsidiaries of the International Silver Company, has granted an increase of 10 per cent in wages and a 55-hr. week with 60-hr. pay.

Since Sept. 1 there have been strikes in eleven Hartford factories. On that date these plants employed 9620 men. On Dec. 1 the same plants had 10,245 men at work. The only closed shop in the city, which formerly operated on an 8-hr. basis, is now running an open shop on a 9-hr. basis.

The Providence and other Rhode Island shops which have had labor troubles, are now employing more men than before the strikes occurred. Elsewhere the situation is unchanged.

Labor Troubles Among Molders

On Monday, Dec. 13, the molders of most of the leading foundries in Pittsburgh struck for an 8-hr. day at $4 per day, the present rate for 9 hr. It is estimated that from 1000 to 1100 men are idle. The demand was made about six weeks ago, and the employers refused to grant it. Reports that many of the foundries have contracts for war material are officially denied, this being the case with only one or two. The founders insist that they will not grant the demand for an 8-hr. day.

The union molders employed in the foundries at Cleveland, Ohio, that make heavy castings have demanded an increase in wages from $3.50 to $4 per day of 9 hr., starting Jan. 1. The light foundries in Cleveland are open shops and are not affected by the demand.

M. Rumely Plants Sold

At La Porte, Ind., Dec. 9, the properties of the M. Rumely Company, manufacturer of threshing machines, farm tractors, etc., capitalized at $32,000,000, were sold for $2,500,000 at a receiver's sale to the Advance Rumely Company, composed of stockholders, noteholders and creditors of the old company, and capitalized at $26,250,000. The Rumely Products Company, the sales end of the M. Rumely Company, was also sold, being bought by the Advance Rumely Company for $1,500,000.

The No. 2 blast furnace of the Pennsylvania Steel Company at Steelton, Pa., was blown in Sunday, Dec. 12, after being idle since May 23, 1914. The first cast was made Monday morning, when 250 tons of pig iron was poured. With the starting of this furnace the entire metal making department at Steelton is in operation for the first time in two years. With five blast furnaces operating, the plant is turning out an average of 1400 tons of iron daily.

The Haynes Stellite Company, Kokomo, Ind., has placed a contract with the Snyder Electric Furnace Company, Chicago, for an electric melting furnace. The furnace has an eighth of a ton holding capacity, 50 k.w. input and will produce 12 heats or 1½ tons per 24 hr. The Haynes Stellite Company is the manufacturer of the cutting alloy Stellite.

Brass Manufacturers' Convention

The twentieth annual convention of the National Association of Brass Manufacturers came to a close at the Hotel Astor, New York City, on Thursday evening, Dec. 9, with a banquet given in the Rose Room, which was attended by a full representation of the membership. Among the invited guests were L. O. Koven, president Eastern Supply Association, who delivered a very interesting address, and Charles Simmons, who outlined what had been accomplished by the Eastern and local associations. Other guests were Franklin Wolff and A. S. Hills, Jr., of Chicago. C. C. Hale, the retiring president, acted as toastmaster.

The meeting, which preceded the banquet, was largely given up to the discussion of topics pertaining to the trade, more prominently among which was the question of the attitude of labor as to the 8-hr. day. It was the consensus of opinion that the well-established 9-hr. day in the trade, which the manufacturers frankly conceded over ten years ago, from the 10-hr. to the 9-hr. day, without any reduction in pay at that time (which in itself meant quite an increase in wages) was all that could be possibly be borne by them now from a practical and economic standpoint. The preparation of a new constitution and by-laws was ordered.

Data read, comparing business conditions and costs this year with a year ago, taken from the membership at large who participated in this matter, proved a surprise to some. The volume of business compares quite favorably with the year previous, with brighter indications ahead and an apparent disposition on the part of the members in view of present costs to advance prices to a higher level.

An important step was taken by the association in providing an executive officer for the three principal divisions of the trade, namely, one section that sells its goods exclusively to the jobber, another which sells both to the jobber and to the dealer, and the third which caters practically exclusively to the plumber. Each of these groups is to be especially looked after by the officers of its division, the purpose being to place an additional responsibility upon the executive officers and the trustees elected for their representative divisions. The following officers were elected:

President, Adolph Mueller, H. Mueller Mfg. Company, Decatur, Ill.; first vice-president, Edward F. Hoffman, Hoffman & Billings Mfg. Company, Milwaukee, Wis.; second vice-president, Charles H. Downs, E. Stebbins Mfg. Company, Springfield, Mass.

Trustees: Adolph Mueller, Edward F. Hoffman, and Charles H. Downs; Otto Ernst, American Sanitary Mfg. Company. Abingdon, Ill.; C. C. Hale, Peck Bros. & Co., New Haven, Conn.; W. H. Wasweyler, Milwaukee Brass Mfg. Company, Milwaukee, Wis.; W. J. Schoenberger, United Brass Manufacturers Company, Cleveland, Ohio; Harold W. Wolff, L. Wolff Mfg. Company, Chicago, Ill.; John M. McDonald, A. Y. McDonald Mfg. Company, Dubuque, Iowa.; Arthur J. Fisher, Glauber Brass Mfg. Co., Cleveland, Ohio.

Representatives to the National Committee: A. S. Hills (Eastern), Haydenville Company, Haydenville, Mass.; H. N. Gillette (Western), Standard Sanitary Mfg. Company, Pittsburgh, Pa.; W. M. Webster, commissioner, Chicago, Ill.

The divisional matter referred to previously will be as follows: Plumbers' Division—Adolph Mueller, president; W. J. Schoenberger, and Arthur J. Fisher. Manufacturing-Jobbing Division—Edward F. Niedecken, first vice-president; C. C. Hale, Harold W. Wolff, and John M. McDonald. Jobbing Division—Charles H. Downs, second vice-president; W. H. Wasweyler, and Otto Ernst.

For long and faithful service, especially in reference to the work done on the last official catalog, and as a mark of appreciation, the association presented the commissioner, William M. Webster, with a handsome chest of silver, suitably engraved, after which it adjourned to meet in Chicago March 20, 1916.

The David Lupton Sons Company has moved its Chicago office from 921 Peoples Gas Building to 743 Insurance Exchange.

Goodyear Tire & Rubber Company

The annual meeting of the Goodyear Tire & Rubber Company was held at Akron, Ohio, Dec. 4. Reports presented show that 1915 was the greatest and most profitable year in the company's history. In the election of officers which followed the re-election of directors, three individuals were rewarded, by conspicuous promotions, for their able services. Secretary G. M. Stadelman, who has been sales manager from the inception of the company, was made a vice-president. He continues as sales manager. P. W. Litchfield, who has been factory manager almost since the beginning, was also elected a vice-president. He will continue in charge of factory operations. The company thus has three vice-presidents, C. W. Seiberling, formerly vice-president, being re-elected. A. F. Osterloh, assistant secretary, was elected secretary. He is also assistant sales manager. He began as a Chicago branch salesman in 1902. The other officers for 1916 are: F. A. Seiberling, president; F. H. Adams, treasurer; W. E. Palmer, assistant secretary and assistant treasurer; H. J. Blackburn, second assistant treasurer. The volume of business for the year was more than $36,000,000, as against $31,000,000 in 1914. President Seiberling stated to the stockholders that all indications are for a 50 per cent increase for next year. Factory additions of more than eleven acres, now being constructed, will make room for the increased working force required. The company made over 2,000,000 tires in the year just closed. A fine business is being built up in other lines. Neolin, replacing leather soles, is making more than satisfactory headway and the mechanical goods division is booming.

Mutual Insurance Taxation in Kentucky

The State Insurance Commission of Kentucky, which is drawing up a new fire insurance code for presentation to the Legislature in January, recently gave a hearing to representatives of mill and factory mutual fire insurance companies, which are anxious that a change be made in the laws relating to the taxation of premiums of companies of that class. At present the gross premiums are taxed, where as it is contended that, since the premium deposited is usually considerably in excess of the net cost of the insurance, a large return being made to the members at the end of the insurance year, the latter factor instead of the gross deposit should be made the basis of taxation. It was further explained that owing to the present arrangement many mutual companies refuse to enter the State. The commission indicated that the changes suggested would be made.

Western New York Merchants Consolidate

The Hazard, Coates & Bennett Company, iron, steel and metals, Rochester, N. Y., will be taken over Jan. 1 by a new corporation under the name of Coates, Bennett & Reidenbach, Inc., which will also take over the following: Genesee Metal Company, Rochester, N. Y., and Lackawanna Storage Yards, Inc., Lackawanna, N. Y. The capital stock will be $250,000. Headquarters will be at Rochester. The persons in active management will be John Bennett, now president of the Hazard, Coates & Bennett Company, F. W. Reidenbach, now president of the Genesee Metal Company, and R. H. Coates, now treasurer of both companies. The combination of the iron and steel business of the Hazard, Coates & Bennett Company and the non-ferrous metal business of the Genesee Metal Company will enable the new company greatly to enlarge its scope of work.

J. Warren Ijams has been appointed receiver of the Inland Steel Castings Company, Terre Haute, Ind., on petition of the Standard Wheel Company of that city. The suit is understood to be of a friendly nature to carry the company over a temporary financial embarrassment. It has profitable contracts with several automobile concerns. The receiver will continue to operate the plant.

Proposed Munitions Legislation

WASHINGTON, D. C., Dec. 14, 1915.—In the first week of Congress no less than half a score of measures have been brought forward in the Senate or House proposing legislation of the highest importance to manufacturers of war material. These proposals range all the way from the establishment of a Government monopoly of the manufacture of munitions and all other kinds of war material, including submarines, to the placing of a tax of 20 per cent on the production of all private plants intended for exportation. Certain of the measures provide for embargoes prohibiting the shipment of war material to any country for use against the people of any nation with which the United State may be at peace. President Wilson's proposition to tax pig iron and "fabricated" iron and steel has stimulated a movement to tax or regulate war material, and many other measures are now being prepared for early introduction.

Seantor Cummins of Iowa, who is an important figure in the Senate, has presented a joint resolution creating a Government monopoly in the manufacture of war material. The preamble of his resolution declares that the profit incident to the manufacture and sale of war material has a tendency to corrupt public opinion, disturb international peace and prevent a peaceful settlement of disputes between nations; that it ought to be made impossible for any person or corporation to make money out of war. "For its own safety and protection, the Government," it is further declared, "should manufacture all arms, armament and munitions of war for the equipment, construction and use of the army and navy, to the end that it may be independent of individual or corporate interests." It is therefore provided that a committee of five senators shall be appointed to examine and report as follows:

> First, the most feasible plan of acquiring or constructing manufacturing plants of sufficient capacity to supply the army and navy with all arms, armament and munitions of war, including ships and their equipment; second, the probable cost of such manufacturing plants, taking into account both present and future military needs; third, the proper locations for such manufacturing plants; fourth, the necessary legislation to prevent either persons or corporations from continuing such manufacture, and when such legislation should take effect.

Senator Thomas of Colorado, who is a leading member of the Senate Finance Committee, has presented a bill requiring all persons engaged in the construction of warships, or the manufacture of naval or military munitions, to supply the Government until 1920 with such of their products as may be required for the increase of the army and navy at actual cost plus 6 per cent, and that all such material shall be transported by railroads and steamship companies on similar terms. Should manufacturers or transportation companies refuse to render the service required, their plants and facilities may be seized by the Government, which shall compensate the owners at a rate not to exceed 6 per cent on the actual investment, with a reasonable added allowance for deterioration. A further provision of the bill creates a "department of communication and transport" charged with the duty of operating and controlling all systems of telephone, telegraph and railroad in conjunction with the army and navy during time of war.

An important amendment to the neutrality laws is proposed in a bill introduced by Senator Hitchcock of Nebraska, which provides that "it shall be unlawful and treated as a breach of the neutrality laws of the United States for any person . . . to sell or contract to sell . . . during the existence of war between nations with which the United States is at peace any arms . . . and explosives of any kind whatsoever to be used against a country or nation with which the United States is at peace." Any person violating this act may be fined not more than $100,000 and imprisoned not more than three years, and any arms, ammunition, artillery, and explosives, the exportation of which is attempted, shall be forfeited, one-half to the informer and one-half to the United States.

An elaborate measure proposing the establishme of a monopoly for the manufacture of explosives the Government has been introduced by Representati Kent of California. The preamble of this resoluti declares that there exists "an international trust the matter of the manufacture of explosives und which foreign manufacturers have bound themselves refrain from selling powder in the United States ev to the United States Government."

Representative Porter of Pennsylvania has intr duced in the House a joint resolution authorizing t President, in his discretion, "to prohibit the export arms, ammunition and submarines of every kin whether whole or in parts to be later assembled, fr the territory or any seaport of the United States un otherwise ordered by the President or by Congress

Another embargo proposal is embodied in a reso tion presented in the House by Representative Ca of Wisconsin, creating a new classification of "co traband of war" the exportation of which the Preside is directed to prohibit by embargo. This category cludes practically everything that can be used in a way in connection with warfare, including railro material, barb wire, horse shoes, brass, pig ir iron and steel, etc.

A proposition to amend the emergency war reven act by placing a tax on munitions has been brou forward in the House by Representative Shacklefo of Missouri, whose bill provides for a tax of 20 p cent of their value, except "when manufactured for t Government of the United States upon its order or f any State of the United States upon its order."

The comprehensive consideration of these vari measures at an early day is precluded by the f that, because of the subject-matter or proposed meth of treatment, the bills have been widely distributed different committees. The Cummins resolution h been sent to the Committee on Naval Affairs; t Thomas to Military Affairs; the Hitchcock to the Co mittee on Foreign Relations; the Kent to the Ho Committee on Military Affairs; the Porter and Cary the Committee on Interstate and Foreign Commer the Shackleford to the Committee on Ways a Means. It is probable that the first battle in the ca paign to tax munitions will be fought out when t Ways and Means Committee brings forward its co prehensive measure to revise the revenue laws to m the increased cost of the national defense and t current Treasury deficit. W. L. C.

Non-Delivery of Machine Costs Maker $1,350

According to E. W. Lewis, vice-president of the T ken-Detroit Axle Company, Detroit, Mich., his compa bought some new boring machines of improved desi These machines were to have been delivered on May 1 this year, but not until the second week of Novem did the machine finally appear on a flat car in the T ken yards. By the purchase conditions of the contr the manufacturer lost $1,350 on this one machine, purchase price of which was in the neighborhood $4,000, for he could not get stock to build the mach any sooner than he did.

Many automobile manufacturers and motor car pa makers, he says, are quite seriously handicapped at t start of the new season by the inability of the tool m ers and machine builders to ship new machines, to and other mechanisms necessary in the building of m tor car parts.

The Buckeye Engine Company, Salem, Ohio, shortly be taken out of the hands of the receiver, lowing the purchase of a controlling interest in company by E. S. Griffiths, general manager Clevel Machine & Tool Company, Cleveland. The comp has been reorganized by the election of the follow officers: President, E. S. Griffiths; vice-president, H. Mullins; secretary and treasurer, Hiram Greiner. The officers and J. C. Cromwell of Cl land and H. H. Sharp of Salem comprise the boar directors.

Machinery Markets and News of the Works

BRITISH HIT SPECULATORS

To Regulate Importations—Not Bar Them

Foreign Buying Lighter, but Domestic Demand Grows Despite Long Deliveries — New Shops Promising for the Near Future

The announcement that Great Britain would prohibit the importation of machine tools except where importers were licensed by the British Board of Trade was a cause of apprehension among many members of the trade until the license feature was clearly understood. Builders whose commitments call for future deliveries in the United Kingdom naturally were worried, but they were promptly reassured when they consulted with persons having connections with Great Britain. Machines which were sold through the British fiscal agents, or through the several well-known houses of importers will not be affected by the prohibition. The explanation of the situation is that Britain intends, not to bar, but to regulate imports with a view of halting speculation which has been detrimental to the British public and to the Government itself. Many representatives of the machine tool industry welcome the decree of regulation, as it will have the effect of eliminating many irresponsible brokers who sought to realize exorbitant profits on tools they purchased here. After Dec. 21 only recognized firms will be permitted to import tools.

Foreign buying is lighter in New York, but Russian agents are more numerous than ever, and they say that early in 1916 they will purchase heavily. Lancia & Company, automobile makers, of Italy, are seeking a large-sized list of tools.

The domestic demand continues to grow, though its progress is hampered by the long deliveries invariably stipulated by tool builders. That the future holds much in store for the trade is indicated by the number of new shops in course of construction. Philadelphia, for instance, reports that machine shops of notable size are to be built for the Midvale Steel & Ordnance Company, the Bethlehem Steel Company, and the Pennsylvania Steel Company, while the Touraine Company, maker of automobiles, has leased a large factory now being constructed, which will make the company's fourth plant in or near Philadelphia.

The automobile makers continue active buyers in Cleveland, but that city reports that some buyers are withdrawing from the market because of inability to obtain suitable deliveries. In Cincinnati, the striking machinists are returning to work and the situation is considered quite satisfactory. Improvement in this direction is noticed at Hamilton, Ohio, while the trouble at Columbus has disappeared. The export demand for lathes has slackened in the Middle West. At Indianapolis the Premier Motor Car Company has been reorganized and has purchased the plant of the T. B. Laycock Company. Several new buildings will be erected and a working force of about 4000 will be employed.

Makers of agricultural, concrete-working and other machinery in Milwaukee are busy though they usually are slack at this season. Both skilled and unskilled labor is hard to get. All of the metal-working trades are affected by the shortage of raw materials and their advancing prices, and in some cases resort is had to other than the usual materials.

Demand is less heavy, but still above normal, in the Birmingham district, and second-hand tools are eagerly sought. Oil-well equipment is active in Texas. The National Railways of Mexico is formulating plans for the construction of large shops in Mexico for the manufacture of rolling stock. On the Pacific coast boilers, engines and electrical equipment are in active demand for mining developments.

Continued activity is felt in the Canadian steel trade, and in all that pertains to the manufacture of munitions. The Grand Trunk Railroad shops at Point St. Charles, Que., were destroyed by fire Dec. 10.

British Government Order Does Not Affect Established Firms

(By Cable)

LONDON, ENGLAND, Dec. 15, 1915.—Machine tools can be imported under Board of Trade license, which will be granted to firms established in business here at least two years before the war broke out and doing business exceedingly £10,000 annually. Firms authorized to import must undertake to limit their profits to 18½ per cent. The object of the recent order prohibiting general importations of machine tools was to eliminate small dealers and mushroom firms who have been importing second-hand machines and rubbish and selling at inflated prices. Machine-tool importers acting as merchants must limit profit to 10 per cent.

New England

BOSTON, MASS., Dec. 13, 1915.

The order prohibiting the importation of machine tools and parts thereof into Great Britain after Dec. 21, except through the British Board of Trade, is expected to make but little difference to New England manufacturers. The sales to England have been largely through British houses which maintain branches in this country, and it is understood that these trade channels will remain unaffected. At the present time the largest part of the machine tools exported are going to France and Russia, and many find their way to the smaller belligerent and neutral nations.

The old Billings & Spencer Company plant at Russ and Lawrence streets, Hartford, Conn., has been bought by a syndicate of Hartford manufacturers who are planning to use the buildings to foster small industries, as no suitable factory is now available for that purpose. It is reported that the group of purchasers represent the Pratt & Whitney Company, Whitney Mfg. Company, Underwood Typewriter Company, Hartford Rubber Works Company, Taylor & Fenn Company, Hartford Machine Screw Company, Hart & Hegeman Mfg. Company, Colt's Patent Fire Arms Mfg. Company and Royal Typewriter Company. The certificate of incorporation is issued to the Hartford Factory Owners, Inc.

The deed transferring the plant of the Fuller Mfg. Company, New Haven, Conn., to the Maxim Munitions Corporation has been filed, completing the formal transfer. It is reported that the latter company has also purchased the plant of the Secor Mfg. Company, Derby, Conn., which will be used for the manufacture of cartridges.

The Scovill Mfg. Company, Waterbury, Conn., is understood to be planning the immediate extension of the large five-story building recently erected at Hamilton Avenue and East Main Street.

The personal property of the Monarch Valve & Mfg. Company, Warren, Mass., has been sold at trustees' sale to A. H. Hovey, Springfield, Mass., who has a large interest in the company's real estate. It is expected that a new corporation will be formed.

The Tremper-Shields Company is a new New Haven, Conn., corporation with authorized capital of $50,000. It is announced that the new company will conduct a general machine shop. The corporation has been formed by Charles W. Tremper, secretary and treasurer of the Fuller Mfg. Company, and Edward R. Shields, a foreman for the same company. It is anticipated that the Tremper-Shields Company will take over the business of the Fuller Company. No location has been decided upon.

The New Haven Mfg. Company, Orange, Conn., has been incorporated with authorized capital of $25,000 to manufacture automobile parts. Charles H. Adams of Waterbury and Walter Hodgkinson of Hartford are interested in the company.

The Union Metallic Cartridge Company, Bridgeport, Conn., has made arrangements with the Brown Machine Company, Winsted, Conn., to use the Brown plant for the manufacture of tools. The Union Metallic Cartridge Company is to supply a force of toolmakers.

The Hitchcock Gas Engine Company, Bridgeport, Conn., has been acquired by Sloan Dannenhower, Inc., of 134 Broadway, New York City. Captain Dannenhower has been for many years a Government expert on submarine boats and was for a long period inspector at the plant of the Lake Torpedo Boat Company. It is reported that the plant will be greatly enlarged and will probably specialize in the manufacture of gas engines for submarines. Frank I. Hitchcock will remain as president and treasurer of the company and no changes are expected in the operating staff.

It is reported that the P. & F. Corbin division of the American Hardware Company, New Britain, Conn., has received a large war order from the American Can Company for shell parts.

Landers, Frary & Clark, owners of the Humason & Beckley factory, will build an addition, 30 x 105 ft., two stories. The Humason & Beckley Company is very busy on orders for pocket cutlery. The addition will be largely used as a grinding room. Both are at New Britain, Conn.

The Foundry Motor Car & Mfg. Company, St. Albans, Vt., has leased and practically reconstructed the plant formerly occupied by the St. Albans Foundry & Implement Company. The new company will carry on a general automobile and machine shop business.

The Lennox-Kinghorn Drop Forging Company started its new plant at Rocky Hill, Conn., last week. W. H. Lennox, president, was for many years in charge of the Dividend plant of the Billings & Spencer Company, Hartford, Conn.

War orders for shrapnel and primers for the Russian Government are reported as responsible for the efforts of the Westfield Mfg. Company, Westfield, Mass., to largely increase its working force. The company has been successful, it is said, in securing a considerable number of toolmakers and skilled machinists from the nearby cities.

Chicago

CHICAGO, ILL., Dec. 13, 1915.

Fire did about $10,000 worth of damage to the core room of the Illinois Malleable Iron Company's plant at 1901 Diversey Boulevard, Chicago, Ill.

The Belvidere Screw & Machine Company, Belvidere, Ill., will erect a new factory on the grounds where its two buildings are now located.

Fire completely destroyed the "dust mill" of the American Refractories Company at Rockdale, Ill., with an estimated loss of $10,000.

The Burrill Mfg. Company is erecting a factory at Kankakee, Ill., where it will manufacture cement-working implements and farm tools.

The Miller-Lillich Company, Fort Wayne, Ind., has been incorporated with a capital stock of $100,000 by Thomas A. Nelson, Emmet G. Reed, William N. Ballou, William H. Lillich and Harry Miller to manufacture an anti-skidding device.

The Clore Plow Works, Washington, Ind., is adding some ten or twelve new machines to the equipment of its machine shop in order to be able to take care of its increasing business.

The American Sewer Pipe Company, Brazil, Ind., has plans for a new building, 50 x 96 ft., three stories, which will be built at the north of its present structure.

The Goodale Company, Kalamazoo, Mich., which has been entirely reorganized and incorporated with a capital of $60,000, has plans for a large factory building to be erected in the spring.

The D'Arcy Spring Company, Kalamazoo, Mich., has plans for further enlargements to its plant, which will be made in the spring.

The Dake Engine Works, Grand Haven, Mich., which is just completing a small addition to its foundry, is now taking bids on an addition, 40 x 110 ft., of brick and steel construction, to be erected at once.

The Columbia Truck & Trailer Company, Pontiac, Mich., has broken ground for a new factory.

Improvements are under way at the plant of the Lansing Foundry Company, Lansing, Mich., which will cost about $10,000. An addition, 70 x 100 ft., is being erected which will provide for an additional cupola and core room.

The Cement Tile Machinery Company, Waterloo, Iowa, will erect a building, 36 x 80 ft., to be occupied by the sheet metal department.

The Santa Fe roundhouse at Pratt, Kan., was destroyed by fire.

The Larson Ice Machine Company, Chicago and Fort Madison, Iowa, has let contract for a foundry to be erected at the latter place. The building will be 40 x 150 ft., and will be constructed of brick and steel throughout.

The American Can Company will erect an addition to its plant at St. Paul, Minn., to cost about $100,000.

The Lead Coating Mfg. Company, a subsidiary of the Brown Sheet Iron & Steel Company has been incorporated and will start work immediately on a metal coating and galvanizing factory at St. Paul, Minn.

New York

NEW YORK, Dec. 15, 1915.

The news, published in THE IRON AGE last week, that the importation of machine tools and parts thereof into the United Kingdom had been prohibited, except in the case of importers who are licensed by the British Board of Trade, created a stir in this country, especially in quarters where the license feature was not understood. The royal decree ordering the prohibition will become effective Dec. 21. Several exporters of machine tools and representatives of English firms cabled to England for an explanation of the move. It is now conceded by those interested that the purpose of the provisional prohibition is to put a stop to speculation in tools in England. There have been innumerable agents and free-lance purchasers in the United States buying both new and second-hand machines for export to Great Britain. In some cases, machines have been sold and re-sold before shipment, and many stories are told of the high prices which must ultimately be obtained to make the final transaction profitable. Several makers of machine tools have been assured by those having close connections with Great Britain that the change will not affect what they term legitimate exports from this country.

Foreign buying has decreased in volume in the past few days, although there are now more Russians at New York hotels than at any time heretofore. The Russians are making many inquiries, and while some are placing orders, others say they will not purchase until January or February, when they expect to contract for deliveries to be made when the port of Archangel is open to navigation. By deferring their buying it is questionable if they will be able to obtain the deliveries they want, but it is difficult to convince them that such may be the case.

Lancia & Company, automobile makers, of Italy, are inquiring for a good-sized list of tools.

Domestic inquiry continues to grow in volume, and a few requirements are important as to size. Many shell makers are buying to round out their equipment, among them the New England Westinghouse Company, Chicopee Falls, Mass. Several machines have been bought by the Simms Magneto Company, Bloomfield, N. J., and by the General Electric Company, Schenectady, these being representative names of recent buyers. Some good inquiry is coming from the western part of New York State.

The Quigley Furnace & Foundry Company, 105 West Fortieth Street, New York, has taken a contract for brass cartridge disks, and is in the market for brass rolling mill equipment. It will run about eighty fires in its plant at Springfield, Mass, and will install six stands of rolls. The contract will keep the company busy for two years, according to present estimates.

The Pennsylvania Equipment Company, Coleman Building, Philadelphia, Pa., is in the market for a second-hand shear, capacity to shear 1⅝ in. x 1⅝ in. or ¾ in. x 6 in. cold soft steel, or to punch a 1-in. hole in a ¾-in. plate, floor space 6 ft. x 8 ft. 3 in., to be arranged for motor drive; and for one roller straightener, or gag press for 6-in. x 6-in. angles. Jas. E. Bough is manager.

The Gehnrich Indirect Heat Oven Company, 60 Franklin Avenue, Brooklyn, N. Y., will install eight enameling ovens in the plant of the Stewart-Warner Speedometer Corporation, Chicago; six in the works of the National Cash Register Company, Dayton, Ohio, and three for the Lyon Metallic Mfg. Company, Aurora, Ill.

The White Sewing Machine Company, Cleveland, Ohio, has leased to Nordyke & Marmon, Inc., Indianapolis, Ind., the property at 42 West Sixty-second Street, New York City, 60 x 100 ft., on which the lessee will build a five-story automobile salesroom and service department, from plans by B. Hustace Simonson, 315 Fifth Avenue, New York.

The Endicott Forging & Mfg. Company, Endicott, N. Y., is receiving bids for a steel addition to its plant. Sacket & Park, Syracuse, N. Y., are the architects.

The Joseph Dixon Crucible Company, Jersey City, N. J., is erecting a four-story warehouse and shipping department, 40 x 150 ft.

The Butwell Building Corporation, 120 Broadway, New York, will erect a six-story factory at Water and Montgomery streets to cost about $125,000.

The plant of the Owego Bridge Company, Owego, N. Y., has been purchased by A. H. and C. S. Mallory, Binghamton, N. Y, who will remodel and enlarge it for use as a fabricating plant for the Binghamton Bridge Company and the Syracuse Bridge Company.

The T. H. Symington Company, Rochester, N. Y., manufacturer of railroad specialties, couplers, etc., has commenced an addition to its plant at Lincoln Park to cost $25,000.

The Rochester Stamping Company, Rochester, N. Y., has let contracts for a factory 60 x 151 ft., one story.

The Plastergon Wall Board Company is to move its plant from Tonawanda, N. Y., to Buffalo, and will erect a factory 100 x 300 ft., with office building 60 x 60 ft., at Philadelphia Street and the New York Central Railroad.

Philadelphia

PHILADELPHIA, PA., Dec. 13, 1915.

It is reported that the Eddystone Munitions Company, Eddystone, Pa., is now installing 13 annealing and case-hardening furnaces for heat treatment of its products.

The Midvale Steel & Ordnance Company, Nicetown, Pa., has awarded contract to Barclay White & Co., 1530 Chestnut Street, Philadelphia, for the construction of a one-story brick and steel machine shop, 60 x 550 ft. It has had plans drawn for a one-story brick and steel powerhouse for its Worth department, Coatesville, Pa., 64 x 170 ft.

The Bethlehem Steel Company, South Bethlehem, Pa., has awarded contract to the William Steel & Sons Company, 1660 Arch Street, Philadelphia, for the construction of a three-story machine shop, 65 x 455 ft., to cost about $100,000.

The Schwarz Wheel Company, Margaret Street, and the Philadelphia & Reading Railroad, Philadelphia, Pa., has purchased six acres of ground from the Keystone State Construction Company on Shelmire Street near Tulip, Frankford, to provide for its increased business and output. It will be used largely for storage, etc.

The Touraine Company, manufacturer of delivery cars, Broad and Huntingdon streets, Philadelphia, has leased from Kahn & Greenberg a four-story brick and concrete factory, which the latter company is erecting at Twenty-third and Market streets at a cost of about $750,000. It will contain about 256,000 sq. ft. of floor space and is planned to be completed about April 1, 1916. This plant will be an addition to the company's four present plants in and about Philadelphia. Harold Larzelere is vice-president and general manager.

The Autocar Company, Ardmore, Pa., has increased its capital stock from $1,000,000 to $2,000,000, to take care of its increased business, and has added James S. Austin, Ardmore, and Frank C. Lewin, who has been for some years assistant secretary and treasurer of the company, to its board of directors.

Harrison Brothers & Co., Inc., Thirty-fifth Street and Gray's Ferry Road, Philadelphia, are reported to be preparing plans for an acid plant, including four buildings, to be constructed at Paulsboro, N. J.

Albert O. Wood, Pennsylvania Building, Philadelphia, has been awarded contract to build a one-story brick boilerhouse addition, 16 x 53 ft., for the Quaker City Rubber Company, at Comly and Melnos streets, at a cost of about $1,000.

Fire Dec. 6 damaged the plant of Farr & Bailey, Camden, N. J., manufacturers of linoleum, causing a loss of about $10,000.

The Atlantic Steel Castings Company, Philadelphia, has increased its capital stock from $5,000 to $164,000.

The Pennsylvania Steel Company is enlarging its machine shop at North Lebanon, Pa., by an addition 40 x 60 ft.

The Cann & Saul Steel Company, Philadelphia, Pa., has been incorporated with a capital stock of $30,000 by George E. Saul, 4924 Penn Street, David S. Cann, 1531 West Norris Street and Denison K. Bullens, 1218 Allengrove Street, all of Philadelphia, to manufacture iron and steel.

The Niagara Mfg. Company, Philadelphia, Pa., has been incorporated with a capital stock of $10,000 by Harry A. Jacobs, 718 Cherry Street, Philadelphia; S. C. Seymour and George H. B. Martin, Camden, N. J., and F. R. Hansell, Philadelphia, to manufacture bathroom specialties.

A box factory owned by O. Y. Lenhart and E. C. Keister at New Cumberland, Pa., was destroyed by fire Dec. 10.

Thomas M. Seeds, 1207 Race Street, Philadelphia, is taking sub-bids for the construction of a one-story reinforced concrete powerhouse to be erected at Glenolden, Pa., for the H. K. Mulford Company, 428 South Thirteenth Street, Philadelphia. It will be 30 x 40 ft.

Baltimore

BALTIMORE, MD., Dec. 13, 1915.

A contract for the construction of a large addition to the plant of the Standard Guano Company, Curtis Bay, Md., has been awarded to the Richmond Structural Steel Company, Richmond, Va. D. J. Rose, Rocky Mount, N. C., has received a contract for the construction of a powerhouse for the same company.

Electrical mining machinery is to be installed by the Georges Creek Coal Company, Lonaconing, Md.

The Enterprise Hardware Company, Frederick, Md., of which Harry Ebert is president, has started the manufacture of locks, hinges, stoves, shoe lasts, etc.

The Wilmington Leather Company, Wilmington, Del., will add a new buffing room, 18 x 60 ft.

With $50,000 capital stock the Staunton Brick Company, Staunton, Va., has been incorporated. A. T. Smiley is president. It is planned to build a plant with a daily capacity of 30,000 bricks.

The Cementile Roofing Corporation, Norfolk, Va., of which J. P. Williams is secretary, is seeking prices on machinery for the manufacture of roofing material.

The Norton Electric Supply & Equipment Company, Norton, Va., has been incorporated with $15,000 capital stock. M. B. Keller is secretary.

Indianapolis

INDIANAPOLIS, IND., Dec. 13, 1915.

The Premier Motor Car Company, Indianapolis, has been reorganized with $2,500,000 capital stock to manufacture automobiles and has purchased the idle plant of the T. B. Laycock Company in this city. Several buildings will be erected and 3000 to 5000 men will be employed. The Laycock plant is complete and modern, occupying a 40-acre tract. The main building is 300 x 900 ft., of brick, steel and concrete, with a power plant in connection. Those in the new organization include J. C. Flowers of the Gerlach-Barklow Company, Joliet, Ill.; E. W. Steinhart, Indianapolis; C. F. Jensen, president Vanguard Mfg. Company, Detroit; F. W. Woodruff, vice-president First National Bank, Joliet; George Woodruff, president of the same bank and of the Illinois Bankers' Association, and T. R. Gerlach and H. L. Thompson, respectively vice-president and secretary of the Gerlach-Barklow Company. Mr. Flowers, it is said, will be president and general manager of the new company.

The Imperial Drop Forge Company, Indianapolis, has been incorporated with $200,000 capital stock to manufacture drop forgings and has taken over the plant of the H. J. Martin Forging Company, 510 South Harding Street. It plans to make improvements and double the number of employees. Temporary officers are Charles H. Bonbright, president; Thomas Walker, vice-president; Robert I. Gale, formerly connected with the Keeler Brass Company, Grand Rapids, Mich., secretary; F. J. Weiss, treasurer, and George Desautels, who has had about fifteen years' experience with drop forge companies, will be manager.

The Robinson Mining Machinery Company, Indianapolis, has been incorporated with $10,000 capital stock to manufacture mining machines. The directors are Lige Robinson, Oliver Williams and E. M. Shorter.

The Indianapolis Woven Wire Fence Company, Indianapolis, has been incorporated with $10,000 capital stock to manufacture woven wire netting and fencing. The directors are Parmenas C. Jacobs, George W. Whittington and Charles W. Bouslog.

The Middlebury Extension Roof Company, Middlebury, Ind., has been incorporated with $10,000 capital stock to manufacture silo roofs and sheet-metal products. The directors are Charles E. Kauffman, Christian J. Stahly, Ben E. Wise and Ollie E. Cassady.

The plant of the Day Lite Gas Company, manufacturer of individual lighting systems, Fort Wayne, Ind., was wrecked by an explosion Dec. 10. The loss was estimated at $5,000.

The National Steel Castings Company, Hartford City, is busy making cranes and other machinery for European governments.

The Hartig-Becker Plow Company, Evansville, Ind., has changed its name to the William F. Hartig Plow Company.

The Union Iron Products Company has been incorporated at East Chicago, Ind., with $50,000 capital stock to manufacture contractors' supplies. The directors are C. L. Carter, C. E. Kitchen and S. M. Dague.

The Chard Lathe Company, Newcastle, Ind., has added to its power machinery three motors, respectively 25, 30 and 50 hp.

The Crawford & McCrimmon foundry and machine shops, Brazil, Ind., are running at full capacity with double shifts.

The Young Engineering Company, Anderson, has filed preliminary notice of dissolution.

The Hawks Electric Company, Goshen, Ind., has increased its capital stock from $150,000 to $200,000.

The Globe Stove & Range Company, Kokomo, Ind., has increased its capital stock from $500,000 to $600,000.

The Hoosier Panel Company, New Albany, Ind., has been incorporated with $40,000 capital stock to manufacture wood products. The directors are Arthur L. Stout, Arthur O. Binford and James C. Baird.

George H. Bishop & Co., saw manufacturers, Lawrenceburg, Ind., are operating three departments of their plant fourteen hours a day.

The D-M Shock Absorber Company, Kentland, Ind., has been incorporated with $10,000 capital stock to manufacture shock absorbers for motor vehicles. The directors are Daniel W. Markley, Henry J. Russell and Roland R. Cummings.

James G. Simms and Glenn R. Sawyer, Elkhart, Ind., receivers for the Angldile Computing Scale Company of that city, have been authorized to issue receivers' certificates and continue the plant in operation. It has large contracts on hand.

The American Gear Company, Jackson, Mich., has been sold to the Hupmobile Company for $600,000.

The American Pipe Company, Brazil, Ind., will enlarge its plant by a building, 60 x 90 ft., three stories. Seven kilns will also be built.

Milwaukee

MILWAUKEE, WIS., Dec. 13, 1915.

Many industries which count the present time as the usual slack season of the year are working at capacity, with prospects in favor of full-time operations for several months to come. This applies notably to the manufacturers of agricultural machinery and concrete-working equipment. It has been found difficult to get enough skilled labor to man shops to the required number, because of the extraordinary demand from the machine shops for the last six months. All metal-working trades are affected by a shortage of raw materials and advancing prices. In the gasoline engine field the use of aluminum is decreasing rapidly because of the restricted supplies, and makers are again resorting to the use of cast iron wherever possible, particularly on heavy duty motors.

The November report of the Wisconsin Free Employment Bureau, Milwaukee, reflects conditions. Despite the usual slackness the demand for labor last month was 40 per cent greater than for the corresponding period of 1914. The demand for skilled labor is much greater than the supply. With the advancing season, semi-skilled labor is in a harder position for employment than skilled or unskilled men. Machine-tool builders report a slight abatement in the demand, due undoubtedly to a realization that, until production catches up with the demand, there is small chance for deliveries on new orders. Crane builders keep on booking orders and are obliged to bend every effort to make deliveries. Milwaukee building figures thus far for 1915 show a gain of 27 per cent over 1914, the November gain being 71 per cent.

The Auto Transfer Company, 522 Sixty-sixth Avenue, West Allis, Wis., has changed its corporate style to Carter Automobile & Machine Company and increased its capital stock from $5,000 to $25,000. It will do commercial machine work and is enlarging its facilities. O. M. Carter is president.

The Dennis Traction Grader Company, Milwaukee, organized several months ago to build road machinery, has filed notice of dissolution of the corporation.

The Jaeschke Brothers Foundry Company, 3026 Locust Street, Milwaukee, is in the market for one 5-ton electric traveling crane.

Manitowoc, Wis., has voted to consolidate the municipal waterworks pumping station and the electric lighting plant. A new powerhouse will be erected and equipment purchased early next year. Henry Stolze is mayor.

J. W. Watson, Fond du Lac, Wis., will build a garage and machine shop, of brick, 74 x 132 ft., one story, costing $17,000.

The Kimberly-Clark Company, Neenah, Wis., has awarded contracts for the erection of a new powerhouse and an addition to the wet machine room of its paper mills at Niagara, Wis. William H. Ryan is manager.

A machine shop and garage will be opened at Delavan, Wis., Jan. 1, by Budde & Vrooman. Nearly all of the equipment has been contracted for.

The R. L. Frome Mfg. Company, box manufacturer, Howard's Grove, Wis., plans to manufacture motor trucks on a small scale. A 36 x 38 ft. addition is being made to the plant, to accommodate experimental work. The company plans to be ready to start production in March.

The Felker Brothers Mfg. Company, Marshfield, Wis., maker of agricultural machinery, etc., lost practically its entire plant by fire Dec. 4. The loss is $20,000. Work on a fireproof addition was under way at the time and will be pushed. The burned shop will be replaced by a fireproof building at once. A. G. Felker is president.

The garage and machine shop of Harry Wert, New Richmond, Wis., which was destroyed by fire last week will be rebuilt.

A garage, repair shop and light manufacturing building, costing $35,000, will be erected at Seventh and Prairie streets, Milwaukee, under the direction of F. W. Andres, architect, 76 Cawker Building. It will be of reinforced concrete and brick, 50 x 150 ft., two stories and basement.

Detroit

DETROIT, MICH., Dec. 13, 1915.

The Fay-Kultgen Foundry Company, St. Joseph, Mich., has awarded the contract for an addition to its plant which will double its capacity.

The American Injector Company, Detroit, has increased its capital stock from $150,000 to $200,000.

The Sparks-Withington Company, Jackson, Mich., manufacturer of automobile accessories, is building two additions, each 40 x 90 ft.

The Grand Trunk Railroad Company has broken ground for the construction of a large passenger car repair shop at Port Huron, Mich.

Watervliet, Mich., has voted to bond for $23,000 for the installation of a waterworks system.

Farwell, Mich., has voted to bond for $5,000 for an electric lighting plant.

The River Coated Paper Company, Kalamazoo, Mich., will erect a paper mill to cost about $40,000 which will be a one machine plant.

The Frugale Power Company, Whitehall, Mich., has increased its capital stock from $20,000 to $100,000 to enable it to finance the erection of a new dam and power plant.

Cleveland

CLEVELAND, OHIO, Dec. 13, 1915.

The heavy demand for machine tools continues, but the volume of business is curtailed by inability to secure desired deliveries. Some buyers finding that manufacturers are unable to make shipments until far into next year have withdrawn from the market. Sales of standard tools have been made for delivery as far ahead as January, 1917. The demand from the automobile trade has again become active, large orders being for delivery next summer. The Willys-Overland Company, Toledo, has just placed orders for 45 lathes and other machine tool equipment. The Hercules Motor Mfg. Company, Canton, Ohio, a new company which will shortly establish a plant, has been a buyer of machinery during the past few days. The foundries are busy, although not crowded to fullest capacity and many could take on more work.

The business of the Standard Pump & Engineering Company, Cleveland, builder of pumping equipment for water supply systems for residences, has been taken over by the Adamson Machine Company, Akron, Ohio, and will be removed from Cleveland to Akron.

The Lumex Mfg. Company will establish a plant in Lima, Ohio, for building moving picture machines.

The Solar Refining Company, Lima, Ohio, will spend over $1,000,000 in extensions, according to an announcement made from that city, which include the erection of a large, central boilerhouse to replace the two present buildings. Twenty additional stills will be built.

The Mason Tire & Rubber Company, Kent, Ohio, organized to manufacture automobile tires, will erect a concrete building providing floor space of 30,000 sq. ft. O. M. Mason

is president, I. R. Davies, secretary, and D. M. Mason, general manager.

The Hercules Motor Mfg. Company, Canton, Ohio, has been formed with a capital stock of $500,000, to manufacture motors and accessories. It will shortly begin the erection of a two-story building, 65 x 400 ft., and is now buying machinery equipment.

The W. H. Mullins Company, Salem, Ohio, has completed several additions to its plant, including an extension to its press room, 40 x 100 ft.

The Belmont Casket Company, Shadyside, Ohio, will enlarge its plant by the erection of a three-story addition, 80 x 80 ft.

The plant and equipment of the Morgan, Marshall & Cooper Rubber Tire Company, East Liverpool, Ohio, has been sold to the M. & M. Company, Cleveland, which, it is stated, will place it in operation shortly.

The Carbo Steel Post Company and the Thiele & Baker Mfg. Company are new companies arranging to establish plants in Marion, Ohio.

The Falls River Company, Kent, Ohio, has increased its capital stock from $155,000 to $200,000.

Cincinnati

CINCINNATI, OHIO, Dec. 13, 1915.

Local dealers in machine shop and foundry supplies state that the present year will close with a larger volume of business booked than in any previous year in the history of their companies. This is reliable evidence as to the activity of the different manufacturing plants in this vicinity.

Striking machinists are returning to work and, as far as is known, there have been no deflections from the ranks of workmen who previously returned. The situation in Cincinnati is considered satisfactory. Improvement is also noted in Hamilton, Ohio, and a number of shops have started up, but are yet operating with reduced forces. Employers at Columbus, Ohio, where trouble involved only two shops, state it has blown over and that they are operating at nearly normal capacity.

The demand for portable electric drilling machines is good from both domestic and foreign sources. One large shipment was made to Australia last week. The call for lathes for export has slackened, but domestic inquiry shows considerable improvement, although it would seem to be the wrong time of the year for this condition to exist.

George S. Haydock, East Walnut Hills, Cincinnati, is interested in a company to operate a machine shop in Oakley, Ohio.

Work is progressing rapidly on the additions to the plant of the Peters Cartridge Company, Kings Mills, Ohio. Practically all necessary equipment has been purchased.

Harry L. Potts, Provident Bank Building, Cincinnati, is attorney for a company now being organized to operate a sand and gravel pit on the Little Miami River. It is understood that a large amount of special equipment will be required.

Mark Stinsen, Remington, Ohio, will head a company that will install equipment for operating a large gravel pit.

It is announced that the Buckeye Marble Company, Cincinnati, has acquired the idle plant of the Hamilton Scale & Tank Company, Hamilton, Ohio, and will move to that city at an early date. Kloak Brothers & Co., manufacturers of tank, store and office fixtures, have leased part of the Hamilton plant and will also move from Cincinnati within the next two months. Both companies will add to their equipment.

The Hamilton By-Products Company, Hamilton, Ohio, closely identified with the Hamilton-Otto Coke Company, is building a plant at a suburb named Cokeotto, that will be used for extracting raw benzole. D. T. MacLeod is president. All the equipment has been bought.

The Robbins & Myers Company, Springfield, Ohio, will call for bids before Jan. 1 on its proposed addition.

The Miller Improved Gas Engine Company, Springfield, Ohio, has increased its capital stock from $60,000 to $150,000. For the present no additions will be made to the plant.

The Ohio Motor Mfg. Company, Springfield, Ohio, recently incorporated with $500,000 capital stock to erect a plant at Canton, Ohio, has leased part of the plant of the Winters-Coleman Scale Company, Springfield, and will install machinery to manufacture internal combustion engines until its plant at Canton is completed.

The Atlas Brass Foundry Company, Columbus, Ohio, is installing equipment in its new three-story addition.

The Shaw Wire Fence Company, Columbus, Ohio, has decided to postpone erecting a building until after the winter is over.

Birmingham

BIRMINGHAM, ALA., Dec. 13, 1915.

Although a lull in buying is seen in the machinery market, the general demand remains satisfactory and the volume of business is fully up to normal. Second-hand machine tools are eagerly sought and readjusted for new needs. Railroads have become liberal purchasers of shop appliances.

The Cane Creek Tipple Company, Birmingham, has been organized by Henry T. De Bardeleben, G. M. Bowers and the De Bardeleben Coal Company to acquire lands, build docks and establish coal-loading terminals on the Warrior River.

The Central South

LOUISVILLE, KY., Dec. 13, 1915.

Iron and machinery plants continue in full operation and some classes of work require over-time. Boiler and tank manufacturers are busy. The demand for electric motors is picking up, many industrial projects having materialized lately. Ice machines and wood-working machinery are in good call.

The Shannon Bed Spring Company, Louisville, has been organized with $15,000 capital stock by Woodford Shannon and others. It will take over and enlarge a going plant, adding some automatic machinery for the manufacture of springs.

The Dixie Butter Company, 502 Fehr Street, Louisville, is building a power-house and will buy a boiler and an ice machine.

The machinery in the bottling department of the Southern Indiana Brewing Company, New Albany, Ind., was recently destroyed by fire with a loss of $20,000.

A company is being organized in Bloomington, Ind., to make improvements to the local waterworks at a cost of $75,000. Address Mayor Harris.

The Chesapeake & Ohio Railway, with general offices at Richmond, Va., has started the construction of a building at Lexington, Ky., to be equipped as a repair shop.

The Roxa-Kola Company, Winchester, Ky., will add additional transmission and special machinery.

The planing-mill of Frank T. Kister, Jr., Bowling Green, Ky., recently burned with a loss of $40,000, will be rebuilt.

Milton Sanchez, Lexington, Ky., is planning the establishment of a packing plant. The proposed investment is $500,000.

The Kentucky Utilities Company, Lexington, Ky., will install additional generating equipment in its plant at Cynthiana, Ky.

Detailed plans of the Kentucky River Power Company, Hazard, Ky., for a steam power plant at Glomawr, Ky., have been announced by R. L. Cornell, manager and engineer. The plant will cost $300,000 and construction work will begin next spring. A 2000-hp. steam turbine with two 500-hp. boilers, operated with automatic stokers, will be installed. A 750-hp. plant is being equipped to serve until the larger one is constructed.

The Mount Olivet Light & Power Company, Mount Olivet, Ky., is in the market for an oil engine, alternator and supplies for an electric light plant. About 40 hp. is to be developed. W. S. Chandler is manager.

W. W. Gibson & Son, Mater, Ky., will purchase a 35-hp. engine with 40-hp. portable boiler.

The Solvay Coke Company, Ashland, Ky., has purchased additional land and, it is reported, will add two by-products units to its plant.

The Nashville, Chattanooga & St. Louis Railway, with general offices at Nashville, Tenn., will purchase electrical power equipment for operating a coaling station at Cowan, Tenn.

The cotton gin and sawmill of J. T. Norvill, Alamo, Tenn., were burned recently with a loss of $10,000. The power plant and special machinery were destroyed.

The Aluminum Company of America is planning to increase the number of its furnaces at Maryville, Tenn., where several large extensions have been made recently.

The Cleveland Buick Company, Cleveland, Tenn., will purchase repair tools for a garage. George R. Berger and A. M. Bryant are interested.

The Paris Tile, Roofing & Flooring Company, Paris, Tenn., has been incorporated with $20,000 capital stock and will equip a plant at once. T. B. Walker, C. V. Krider and H. E. Kibbons are interested.

Wallace Duff, Athens, Tenn., is organizing the Dixie Highway Tire Company, with $25,000 capital, which will establish a plant to manufacture automobile tires.

The Tennessee Power Company, Chattanooga, Tenn., has approved plans for the development of a water-power plant on Caney Fork River, to develop 10,000 hp., and ultimately 40,000 hp.

The Ooltewah Construction & Improvement Company, Ooltewah, Tenn., will purchase a 75-kw. transformer to supply current from the Tennessee Power Company for local distribution.

The Red River Iron Works, Clarksville, Tenn., has been incorporated with $40,000 capital stock by Graham Macfarlane, H. N. Leech, M. S. Macfarlane, and others.

The Dixie Good Roads Machinery Company, 328 Market Street, Chattanooga, Tenn., is in the market for a steam-driven air compressor with a capacity of 1000 cu. ft. ft. per min.

V. O. Garrison, Fayetteville, Tenn., who is to establish an ice-cream factory, is asking for prices on refrigerating equipment.

The Stafford Coal Company, Baxter, W. Va., is in the market for vertical water-tube boilers.

W. King Davis, Church Road, Va., is in the market for a 35-hp. boiler and 30-hp. engine for the operation of a sawmill.

Texas

AUSTIN, TEX., Dec. 11, 1915.

More prospecting for oil is now going on in Texas than ever. This activity has created an unusually large demand for well-drilling machinery and oil-pumping equipment. Many orders for irrigation machinery are also being placed.

Jackson & Hammond, Alpine, will install three irrigation pumping plants.

The Power Reduction Company, Fort Worth, has been organized to manufacture a pump jack. W. L. Dayton is one of the promoters.

The John T. Beamer Company, Chicago, Ill., which recently purchased the holdings of the American Rio Grande Land & Irrigation Company at Mercedes for $3,000,000, will construct a new pumping plant to cost about $250,000 to water about 100,000 acres of land. It will also build a new town near Mercedes.

The Pandora Gin Company, Pandora, will build a new cotton gin to cost about $7,500. Lee H. Orndorff is in charge.

The National Railways of Mexico has made official announcement that it plans to build large shops at Piedras Negras, Coahuila, Mexico, for the manufacture of freight and passenger cars and other equipment. Alberto Pani, City of Mexico, is director general.

St. Louis

ST. LOUIS, MO., Dec. 13, 1915.

Pressing demand for machine tools has about reached its maximum. Broad inquiry continues, indicative of the spread of the industrial improvement. No change has taken place as to deliveries, and in consequence the development of new industries continues to be held up. Aggregate business is far above normal in the demand, but deliveries are likely to fall below normal. Financially the situation is very bright. Both new and second-hand tools are practically exhausted. Occasionally here and there a used piece of equipment appears and there is a scramble for it.

The equipment of the new building acquired in St. Louis, Mo., by the Booth Fisheries Company will make available about 3,000,000 cu. ft. of cold storage. Refrigerating machinery is to be specified in the plans adopted.

The J. B. Sickles Saddlery Company, St. Louis, Mo., has leased an additional building which it will equip as a manufacturing plant for leather products, etc.

The Attacho Light Company, St. Louis, Mo., has been incorporated with a capital stock of $14,000 by Linn and M. G. Piper and Robert E. Moloney.

The Steele Motor Car Company, St. Louis, Mo., has been incorporated with a capital stock of $12,000 by Frank L. Steele, O. F. Wescoat and C. K. Rowland to establish a machine shop and garage.

The Palson Rubber Company, Kansas City, Mo., has been incorporated with a capital stock of $50,000 by C. A. Palson, Milo E. Wilson and Guy M. Cowgill to manufacture mechanical rubber goods, automobile accessories, etc.

The Mattingly-Graves Automobile Valve Mfg. Company, Cape Girardeau, Mo., has been incorporated with a capital stock of $15,000 by Charles F. Mattingly, Martin L. Graves and Henry A. Nussbaum.

The Times Square Automobile Company of New York, Kansas City, Mo., has been incorporated with a capital stock of $15,000 by Morris Froehlich, Louis Mansbach and Charles C. Carroll to equip a machine shop and rebuilding plant for motor cars.

The Lee's Summit Pipe Line Company, Lee's Summit, Mo., has been incorporated with a capital stock of $18,000 by John A. Eaton, E. H. Graves and J. B. Sampson to operate a pumping plant.

The Protean Electric Sign Company, Kansas City, Mo., has been incorporated with a capital stock of $67,000 by William J. Merrill, H. B. Houck and R. H. Williams.

The Forest City Compress Company, Forest City, Ark., has increased its capital stock from $30,000 to $45,000 to add more mechanical equipment.

The Choctaw Portland Cement Company, Hartshorne, Okla., has been incorporated with a capital stock of $500,000 by P. G. Walker, G. C. Stebbins, L. F. Barnes and N. E. Tuell, all of Tulsa, Okla., and will equip a cement plant of 2000 bbl. daily capacity.

The United States Zinc Company, Sand Springs, Okla., has acquired additional factory site and will more than double the capacity of its plant.

The Industrial & Chemical Mfg. Company, Sand Springs, Okla., will equip a plant for the manufacture of silica, caustic sodas, sulphuric acid and potash. S. H. Locke is in charge.

Jeff's Machine Shop & Auto Garage Company, Cushing, Okla., has been incorporated with a capital stock of $16,000 by L. D. Berry, C. K. Laughlin, H. C. Vineyard and G. W. Barton

Mitchell & Crosbie, Tulsa, Okla., will erect a fireproof machine shop and garage.

The Universal Automobile & Supply Company, Oklahoma, Okla., has been incorporated with a capital stock of $15,000 by W. L. Mower, L. S. Vaughn and W. H. Boon, and will equip a garage.

The Pacific Coast

SEATTLE, WASH., Dec. 17, 1915.

Despite winter conditions, activity has been pretty well maintained. Lumber mills will soon be closing down for the midwinter overhauling, and many improvements will be made in view of the reviving lumber market. Prices for nearly all lumber products have advanced quite sharply, which seems to warrant operations on a larger scale than for over a year past. Considerable new business has been taken by shipbuilding plants, and orders are being placed for some good-sized gas and steam marine engines. Boilers, engines and electrical equipment are in strong demand for mining development, and there are numerous inquiries from miscellaneous manufacturing projects. A few machine-tool orders of some importance are coming out, but such business is limited to actual necessities. Automobile and general repair shop supplies, however, are in very good demand for this time of year.

The Great Western Machinery Company, San Francisco, Cal., dealer in second-hand machinery, has received permission to issue 4400 shares of stock to Philip Shecter in exchange for his business, a second-hand pipe establishment.

The Alaska Petroleum & Coal Company, Seattle, Wash., which has just been granted a patent to a large coal claim in the Behring River field, Alaska, proposes to begin development work soon.

The Oregon City Foundry, Oregon City, Ore., has installed an oxy-acetylene welding plant.

The roundhouse and machine shops of the Nevada Short Line, Nenzel, Nev., were completely destroyed by fire Nov. 30, two locomotives being included in the loss.

The Port of Portland Commission has authorized the purchase of a power hammer, motor, shafting and materials for the Port of Portland drydock.

The Seattle Machine Works, East Waterway at Lane Street, Seattle, Wash., is negotiating with the Chamber of Commerce for a site on the waterfront, on which it plans the construction of a plant larger than it is now operating. It has recently secured an order for a dredge to cost $160,000.

The Libby Lumber Company, Libby, Mont., has increased its capital stock from $100,000 to $250,000. It is reported new funds will be used in making improvements and additions to the plant.

The Halladay Machine & Garage Company, Portland, Ore., has been incorporated for $6,000 by R. T. Earle, Floyd Halladay, Edward Ford and M. L. Cronkrite. It will build a machine and repair shop.

The box and chair factory in Baileysburg, Wash., owned by the Paul Donley estate, was destroyed in a recent fire.

Donaldson Brothers, owners of the electric light plant at Culbertson, Mont., plan the installation of equipment, including an engine and a storage battery.

The Mathews Shipbuilding Company, Hoquiam, Wash., has received contract for construction of a steam schooner for F. S. Freeman, San Francisco. The vessel will be used in the lumber trade, and will have capacity of 1,200,000 ft.

The Hercules Mining Company, Wallace, Idaho, has placed orders for electrical equipment, motors, switches, etc., for its smelter under construction in Northport, Wash. The plant will have capacity of 500 hp.

The Pioneer Mining Company, Vancouver, B. C., will equip its property near Vancouver, B. C., with a power plant to develop 175 hp., four power drills, hoisting plant, and electric lighting. The company is owned by Ferguson & Williams, Vancouver, B. C.

The Repeater Trap Company, Vancouver, Wash., has been incorporated with a capital stock of $16,000 by George W. Fisher, E. L. Shepherd and M. R. Sparks. It is reported the company plans to construct a small plant.

The Lindstrom Shipbuilding Company, Aberdeen, Wash., has re-opened its shipyards for the building of several steam and sailing schooners for the lumber trade. The yards have been idle for a long time, and a number of repairs with installation of new machinery, will be made.

The National Lumber & Box Company, Aberdeen, Wash., announces that its box plant, idle for many months past, will resume operations about Dec. 15.

The Seattle Port Commission has awarded to Lee & Brinton, naval contractors, Seattle, contract for construction of a transbay ferry steamer to cost $30,000.

The plant of the Pacific Waste Company, Macadam and Texas streets, Fulton, Ore., was completely destroyed by fire. The plant was valued at $10,000.

Canada

TORONTO, Dec. 11, 1915.

Continued activity characterizes the steel trade. The volume of business now done by the steel companies is larger than ever and some mills are unable to fill demands. The Steel Company of Canada, Hamilton, Ont., is doubling the capacity of its plant. It has received orders for all the shells it can turn out for the next two years. The Canadian Car & Foundry Company has received contracts totaling $146,000,000. There are practically no strikes or labor trouble at present. In many cases factories are working double shifts. The mining operations of Ontario are exceptionally brisk. This year's building trade of eastern Canadian cities for November shows a substantial increase over November, 1914. Business failures in Canada this past autumn have shown a decided decrease over that period of a year previous. Export trade is greatly in advance of what it has ever been before.

The automobile business shows continued activity. The Ford Motor Car Company will build a large plant at Ford City, Ont. The Crow Motor Company is erecting one at Mount Brydges, Ont. Extensions are to be made to the Russell Motor Car Company at West Toronto, and the Willys-Overland, Ltd., plans the erection of a factory at West Toronto.

S. F. Mackay, Waneta, B. C., is in the market for one portable 16 to 25 hp. engine.

Melfort, Sask., is considering the purchase of a 240-hp. Diesel oil engine for its powerhouse at a cost of $17,000. George A. Weever is clerk.

Fire did $10,000 damage to the Eastern Canada Steel Company's plant at St. Malo, Que.

The Maple Leaf Milling Company's flour mill at St. Catharines, Ont., was totally destroyed by fire Dec. 7, with a loss of $300,000. Hedley Shaw, Dominion Bank Building, Toronto, is manager.

At the annual meeting of the McLaughlin Motor Company, Oshawa, Ont., it was announced that its output will be more than doubled in 1916. R. S. McLaughlin is president and G. W. McLaughlin, secretary.

The Victoria Machinery Depot, Victoria, B. C., will build an extension for the manufacture of war munitions.

The Nova Scotia Steel & Coal Company, Sydney, N. S., is building a large addition to its plant at Sydney Mines, N. S., including the construction of an open-hearth furnace, at a total cost of $100,000.

The Canadian Electro-Products Company, Montreal, will establish a plant at Montreal, and will install an electric furnace and other machinery for the manufacture of shells. Julien C. Smith, J. S. Norris and Howard Murray are the incorporators.

The Canada Cement Company, Montreal, is installing an electric furnace and making other additions to its plant for the manufacture of war munitions.

The Williston Steel & Foundry Company, 504 Robie Street, Halifax, is erecting a steel plant at Dartmouth, N. S., at a cost of $16,000. C. H. P. Williston, 504 Robie Street, Halifax, is the engineer.

Brockville, Ont., will install an electric sewage pump. George Bryson is engineer.

Plans are being prepared by A. McKinnon, town engineer of Glace Bay, N. S., for a pumping unit to cost between $5,000 and $10,000. Mr. McKinnon is seeking information and prices.

The Dominion Steel Castings Company, Ltd., Depew Street, Hamilton, Ont., is making alterations to cost $10,000.

The Williams Mfg. Company, 1789 St. James Street, Montreal, will build a brick and steel foundry to cost $15,000. J. C. McDougall, 511 St. Catharine Street, is architect.

The Grand Trunk Railway Shops at Point St. Charles, Que., were destroyed by fire Dec. 10. The fire broke out in the tube shop and spread to the blacksmith and erecting plant. No estimate of the loss has been made but is expected that it will be very heavy. A large amount of machinery, which will be hard to replace, was destroyed.

The Reliance Clock Company, Ltd., Montreal, has been incorporated with a capital stock of $500,000 by Frank Callaghan, Francois X. Biron, Alfred Tracey and others.

D. M. Gilpin & Co., Ltd., Toronto, has been incorporated with a capital stock of $250,000 by James R. Roaf, 18 King Street West; Howard L. Graham, D. M. Gilpin and others to manufacture steel, metals, etc.

The Walton Office Equipment Company, Ltd., 114 York Street, Toronto, has been incorporated with a capital stock of $40,000 by Albert H. Walton, William F. Campbell, Lewis Sinclair and others.

The Windsor Casket Company, Ltd., Windsor, Ont., has been incorporated with a capital stock of $35,000 by Norman Janisse, Windsor, Ont.; Charles O. DeSaulier, Mount Clemens, Mich., and others.

Capt. Colin Russel and R. J. Russel of Fort Francis, Ont., have received a contract for 10,000 shells to cost $65,000, and will establish a plant at North Bay, Ont.

The Imperial Cordage Company, Ltd., Walkerton, Ont., has been incorporated with a capital stock of $150,000 by John Connor, St. John, N. B., Edward A. D. Morgan and Joseph R. Robillard, Montreal, and others to manufacture rope, etc.

The Diamond Metal Company, Ltd., Montreal, has been incorporated with a capital stock of $20,000 by Jacob Y. Fortier, Abraham W. Muhlstock, Jean C. Duhamel.

The Federal Brass Company, Ltd., Montreal, has been incorporated with a capital stock of $50,000 by Joseph P. A. Belanger, Louis J. C. Gagnon, Joseph E. A. Blais and others.

The G. A. Roy, Ltd., St. Pie, Que., has been incorporated with a capital stock of $50,000 by Ephrem St. Pierre, Louis Gauthier, Philippe Cote and others to manufacture coffins of cement, metal, etc.

The Canadian Vincent Valve Company, Ltd., Victoria, B. C., has been incorporated with a capital stock of $25,000 by Arthur Newham, Roland H. Powell, Edward Bonner and others of Victoria, to manufacture drain valves, etc. Charles W. Buckner, Blaine, Wash., will be mill manager.

The Canadian Electro Products Company, Ltd., Montreal, Que., has been incorporated with a capital stock of $500,000 to manufacture metals. The provisional directors are Walter R. L. Shanks, Daniel P. Gillmor and Francis G. Bush.

Government Purchases

WASHINGTON, D. C., Dec. 13, 1915.

Bids will be received* by the Bureau of Supplies and Accounts, Navy Department, Washington, schedule 9084, for one power-driven pipe threading and cutting off machine for Washington; schedule 9085, for miscellaneous machines for use in ropewalk for Boston; schedule 9087, for three double cylinder winches for Portsmouth.

Bids were received by the Bureau of Supplies and Accounts, Dec. 7, for supplies for the navy yards, as follows:

Schedule 9017, Construction and Repair

Class 182, Boston—one motor-driven saw table—Alexander Dodds Company, $287; J. A. Fay & Egan Company, $398.90; Oliver Machinery Company, $382; American Woodworking Machinery Company, $425; D. Nast Machinery Company, $370.

Class 183, Boston—One wood-working lathe—J. A. Fay & Egan Company, $462; Oliver Machinery Company, $500; American Woodworking Machinery Company, $696.

Schedule 9018, Steam Engineering

Class 191, Brooklyn—nine marine water-tube boilers—Babcock & Wilcox Company, $217,000.

*No date set for opening bids.

Customs Decisions

NET-MAKING MACHINES

The Board of United States General Appraisers has declined to admit net-making machines under the general metal provision of the tariff act of 1913, at 20 per cent duty. This rate was claimed by M. J. Corbett & Co., New York, acting for a firm of American lace curtain manufacturers. Parts of these machines were included in the shipments. The collector held that both the machines and their parts fell under the specific provision in the law for such merchandise, and levied duty at 25 per cent. The parts, among other things, comprised beams and braces intended as reserve or duplicate parts, while another item consisted of lead from which parts required to replace broken ones are cast. The board holds that the machines were properly classified, but grants the lower rate on the parts mentioned. A fourth item designated on the invoices as "barre piqueur" was shown to represent an adjustable attachment of the machines imported, and to be indispensable parts of the machines in performing one of the regular operations, namely, the making of plain or fancy veilings. It was further shown, however, that without this particular attachment the machines in question were fully capable of making nets. The board reached the conclusion that the item last referred to was an integral and indispensable part of the accompanying net-making machines, and as such was properly dutiable at the same rate as the machines themselves, and not at 20 per cent as claimed by the importers.

SPROCKET CHAINS

A somewhat similar case to the above was that of the American Express Company, also acting as forwarder and agent for domestic manufacturers. The merchandise here involved consisted of spare or extra parts of sprocket chains composed of metal. Duty was taken by the collector at New York at 25 per cent under the specific provision in the present tariff for "sprocket chains," whereas the importer claimed a rate of 20 per cent as "manufactures of metal not specially provided for." The uncontradicted testimony was that the parts had no other use than in the making and repairing of sprocket chains. Under these circumstances the board upheld the claim for the lower classification.

VESSEL EQUIPMENT

The board has decided that bolts, nuts, packing and other articles of this character are not "sea stores" within the meaning of section 3111 of the revised statutes of the United States. Instead, the board ruled that the articles became part of a vessel's equipment purchased in a foreign country and are properly dutiable at 50 per cent of their cost. The case before the customs tribunal was that of Warren E. Jones, Buffalo, master of the Great Lakes steamship James E. Davidson, who bought the material at Fort William, Canada, for repairs. The board, in finding against the vessel's master, held that "sea stores" are restricted to the provisions taken aboard for the use of the passengers and crew, and consumed by them. On the other hand, articles of the kind in controversy, being a part of the steamer's equipment, fall, the decision said, in the category of "ship stores," more particularly provided for in section 3114. Equipment purchased, and repairs made in foreign countries on American ships are dutiable, Judge Fischer said, the collector being affirmed.

IMITATION BRONZE FIGURES

It was made plain in a decision by the board in the case of L. D. Bloch & Co., New York, that commercial products manufactured in large quantities for commercial demand and kept in stock for that purpose, both in the country of exportation and in this country, will not be allowed to enter the United States as "works of art" at a low rate of duty. The merchandise in this case consisted of imitation bronze figures cast in a foundry in wholesale quantities and upon which no retouching was done by the artist. Most of the articles were designed for light fixtures, thus serving a utilitarian purpose, although ornamental in character. Judge Waite, denying the importers' claim for entry at 15 per cent as sculptures or works of art, said there was nothing in the record to indicate that an artist had laid hand or tool to any of the importations. The collector was accordingly affirmed in levying duty at 20 per cent under the metal schedule as "manufactures."

METAL DRUMS OR CONTAINERS

Free entry under the tariff was denied to A. Klipstein & Co., New York, on cylindrical metal containers or drums used for holding barium dioxide. The custom house authorities took duty at 20 per cent under the provision for "cylindrical or tubular tanks or vessels, for holding gas, liquids, or other material, whether full or empty." The claim was for free entry as the usual containers of free goods or of goods subject to a specific rate of duty. The proof submitted on behalf of the protestants showed that it was not necessary to destroy or otherwise mutilate the drums in order to take out the contents, and that the cap on the containers may be removed by merely unscrewing two bolts. The board's decision said that as the drums could be used again for the same purpose they were obviously dutiable as assessed.

SCRAP ZINC FROM CUBA

Customs officials must allow a discount of 20 per cent from the regular duty on importations of scrap zinc and wornout railroad car roofing from Cuba, according to a decision by the Board of United States General Appraisers in the protest case of the Yglesias Lobo Company. The collector at New York took duty under the present tariff at the rate of 15 per cent under paragraph 163, which refers to "wornout zinc." He declined, however, to give effect to the terms of the reciprocity treaty with Cuba, which provides for a 20 per cent reduction from the regular duty on any "product of the soil or industry of" that country. The collector, apparently, declined to allow the rebate, presumably on the ground that the zinc articles in controversy were perhaps not originally produced in Cuba. Shortly after the treaty became effective, a case similar in principle to the present one came up and the importers were sustained, the board taking the position that the treaty "embraced all commodities." There have been several appeals by the Government to the Court of Customs Appeals in other cases, but in each instance the appeal was either dismissed or the court, in deciding it, did not pass on the board's construction of the treaty. In view of this situation, Judge Hay followed the earlier decision and held that the scrap zinc importations made by the Yglesias Lobo Company were entitled to the discount specified in the treaty.

STEEL ENGRAVINGS

J. C. Powers entered at Ogdensburg, N. Y., 17,000 steel engraved forms for stock certificates on which duty was taken under the present tariff at the rate of 15 per cent under the provision for "engravings." The importer went before the board with the contention that the forms were free of duty under paragraph 612, which specifically mentions "steel engraved forms for bonds, stock certificates, notes and certificates." It appeared at the trial that the collector himself made a return in the official papers reading "steel engraved forms for bonds." In view of this, Judge Fischer said, in his decision for the tribunal, that "it is not clear why he (the collector) should have classified them for duty as engravings under paragraph 339 when they are clearly entitled to free entry under the eo nominee provision therefor in paragraph 612." The assistant attorney general was unable to make a satisfactory explanation of the collector's return, and Judge Fischer sustained the claim, remarking that the engravings were precisely the character of articles intended by the tariff law to be exempted from duty.